8 AIR QUALITY

This chapter summarizes existing air quality conditions in the project vicinity. The chapter also includes an analysis of the potential impacts of the project's mining and reclamation activities on local and regional air quality. Air quality impacts associated with the operation of the proposed asphalt batch plant are evaluated as well. Mitigation measures are recommended as necessary to reduce significant and potentially significant impacts of the proposed mine expansion project.

8.1 EXISTING CONDITIONS

The Patterson mine site is located in the Sacramento Valley Air Basin of California, an area encompassing all of Sacramento, Yolo, Sutter, Colusa, Yuba, Glenn, Butte, Tehama, Shasta, and parts of Solano and Placer counties. The basin is characterized by complex terrain consisting of mountain ranges, inland valleys, and bays. It is bounded on the west by the Coast Range, on the north by the Cascades, and on the east by the Sierra Nevada. The San Joaquin Valley Air Basin lies to the south.

REGIONAL CLIMATE AND ATMOSPHERIC CONDITIONS

The climate of the Sacramento Valley Air Basin, as with all of Central California, is dominated by the strength and location of a semipermanent, subtropical high-pressure cell over the northeastern Pacific Ocean. Climate is also affected by the moderating effects of the nearby oceanic heat reservoir. Warm summers, cool winters, moderate rainfall, daytime onshore breezes, and moderate humidity characterize regional climatic conditions. In summer when the high-pressure cell is strongest and farthest north, temperatures are very warm and humidity is low, but the daily incursion of the sea breeze into the Central Valley creates persistent breezes that moderate the summer heat. In winter, when the high-pressure cell is weakest and farthest south, conditions are characterized by occasional rainstorms interspersed with stagnant conditions and sometimes heavy fog.

Airflow patterns in the basin can be characterized by one of eight directional types, the most frequent being northwesterly. The northwesterly flow is predominant in spring and summer, but seasonal variations do occur. Calm conditions dominate the winter months.

Terrain features create various microclimates. The pattern of mountains and hills within the basin is primarily responsible for the wide variations of rainfall, temperatures, and localized winds that occur throughout the region. Temperature variations have an important influence on basin wind flow, dispersion along mountain ridges, vertical mixing, and photochemistry. Because the moderating marine influence decreases with distance, monthly and annual spreads between temperatures are greatest inland and smallest along the coast. Precipitation is highly variable seasonally. Summers are often completely dry, with frequent periods of 4–5 rainless months. In the winter, an occasional storm from the high latitudes sweeps across the coast, bringing rain. Annual rainfall is lowest in the inland valleys, higher in the coastal and inland foothills, and highest in the mountains (CARB 1974).

LOCAL CLIMATE AND ATMOSPHERIC CONDITIONS

Temperature and precipitation data were taken from the Auburn monitoring station, which is located approximately 16 miles southeast of the project site. The project area experiences moderate temperatures and humidity. Temperatures average 60 degrees Fahrenheit (°F) annually, ranging from average January low temperatures of approximately 36°F to average July high temperatures of about 97°F. Rainfall in the project area averages 35.1 inches annually and occurs predominantly from October to April (NOAA 1992). Winds in the study area average 5.6 mph annually and blow predominantly from the south (CARB 1994).

METEOROLOGICAL INFLUENCES ON AIR QUALITY

Regional flow patterns have an effect on air quality patterns by directing pollutants downwind of sources. Localized meteorological conditions, such as light winds and shallow vertical mixing, and topographical features such as surrounding mountain ranges create areas of high pollutant concentrations by hindering dispersal. An inversion layer is produced when a layer of warm air traps cooler air close to the ground. Such temperature inversions hamper dispersion by creating a ceiling that traps air pollutants near the ground.

The conditions that form high ambient air concentrations of ozone (O_3) are sunshine, early-morning stagnation in source areas, high surface temperatures, strong and low morning inversions, greatly restricted vertical mixing during the day, and daytime subsidence that strengthens the inversion layer. Because of its long formation time in the atmosphere, O_3 patterns are most affected by transport patterns. The most frequent O_3 transport route is from source areas in the populated rim of the San Francisco Bay area, to inland receptor areas downwind and those areas to the south. On the rare days with offshore flows, O_3 transport is more limited, and the highest concentrations occur in the western portion of the basin.

In the winter, temperature inversions dominate during the night and early morning hours but frequently dissipate by afternoon. At this time, the greatest air pollution sources are derived from carbon monoxide (CO) and oxides of nitrogen (NO_X). High CO concentrations occur on winter days with strong surface inversions and light winds. Carbon monoxide transport is extremely limited. High NO_2 levels usually occur during the autumn or winter on days with summer-like weather conditions. These conditions include low inversions, limited daytime mixing, and stagnant windflow conditions. Although days are clear, sunlight is limited in duration and intensity; therefore, photochemical reactions necessary to form O_3 are incomplete.

Atmospheric particulates are made up of fine solids or liquids such as soot, dust, aerosols, fumes, and mists. A large portion of the total suspended particulate (TSP) matter in the atmosphere is fine particulate matter less than or equal to 10 micrometers in diameter (PM_{10}). The California Air Resources Board (CARB) estimates that PM_{10} comprises approximately 64 percent of TSP matter. These small particulates cause the greatest health risk because they can penetrate the defenses of the human respiratory system more easily than other TSP matter. Peak concentrations of PM_{10} occur downwind of precursor emission sources.

COMMON AIR POLLUTANTS

Common air pollutants of regional concern within the basin are discussed separately below and summarized in Table 8-1.

OZONE

Ozone (O_3) is a colorless, odorless gas that is present in the troposphere in concentrations of a few tenths of a part per million (ppm) or less. Ozone is not usually emitted directly by pollutant-generating sources. It is created by atmospheric reactions between organic compounds (such as solvents and unburned fuels) and NO_X (a product of combustion processes) in the presence of sunlight. Because ozone is created over time by reactions between NO_X and reactive organic gases (ROG) emitted by hundreds of sources in a geographical area, it tends to be higher downwind of the primary source areas. In the lower Sacramento Valley, the highest ozone levels tend to be found in the foothill areas downwind of the Sacramento metropolitan area, which is where most of the NO_X and ROG are emitted. Peak ozone concentrations typically occur during the summer months, when long days allow the chemical reactions to take place over a longer period of time.

Adverse health effects resulting from photochemical oxidants range from mild irritation of the eyes, nose, and throat to possible impairment of lung functions. Other effects include aggravation of respiratory and cardiac diseases, and pulmonary dysfunction. Ozone, the primary constituent of photochemical smog, is a severe irritant to all mucous membranes and primarily affects the respiratory system.

FINE PARTICULATE MATTER

Respirable particulate matter is referred to as PM_{10} when it has a diameter of 10 micrometers or less, and as $PM_{2.5}$ when it has a diameter of 2.5 micrometers or less. Sources of particulate matter include directly emitted particulate (e.g., fugitive dust and smoke), finely divided aerosols (chiefly organic compounds), and byproducts of secondary reactions of emitted sulfates and nitrates in the atmosphere. High concentrations of particulate matter in the urban areas of the Sacramento metropolitan area are often associated with fugitive dust from construction activities rather than industrial and commercial sources, because the latter sources are generally well controlled.

The health effects of particulate matter depend on the nature of the particulate matter. For example, health effects may be associated with metals, polycyclic aromatic hydrocarbons, and other toxic substances adsorbed onto fine particulates or with fine dust particles of silica or asbestos often referred to as the piggybacking effect. Generally, health effects associated with particulate matter may result from both short-term and long-term exposures to elevated levels of particulate matter. These effects may include increased mortality, reduced lung function, aggravation of asthma and bronchitis symptoms, and respiratory disease.

Table 8-1
Common Air Pollutants

Pollutant	Major Sources	Related Health and Environmental Effects
Ozone (O_3) Ground-level ozone is the principal component of smog.	Formed by a chemical reaction of pollutants (ROG and NO_X) in the presence of sunlight; motor vehicles are major sources of ROG and NO_X	▸ Respiratory irritant ▸ Potentially toxic to plants ▸ Corrodes rubber, paint
Suspended Particulate Matter (PM) (10 micrometers or less in diameter)	Combustion of wood, diesel and other fuels, industrial processes, and ground-disturbing activities (e.g., construction and agricultural operations)	▸ Respiratory irritant ▸ Obscures visibility ▸ Corrodes metals
Carbon Monoxide (CO) Typically considered a local pollutant of concern.	Product of the incomplete combustion of petroleum fuels in motor vehicles; localized concentrations of concern are generally associated with areas of high traffic density occurring during peak-hour traffic conditions	▸ Reduces ability of blood to transport oxygen to body cells and tissue ▸ Aggravates cardiovascular disease ▸ Impairs perception and mental processes ▸ Fatal at high concentrations
Nitrogen Dioxide (NO_2) Precursor of ground-level ozone and acid rain.	Combustion of fuels; motor vehicles and power plants are primary contributors	▸ Respiratory irritant ▸ Toxic to plants ▸ Reduces visibility
Sulfur Dioxide (SO_2) Precursor of acid rain.	Coal burning power plants, metal smelters, industrial boilers, oil refineries	▸ Respiratory irritant ▸ Corrodes metal and stone ▸ Damages textiles ▸ Toxic to plants
Lead (Pb)	Smelters (metal refineries; manufacture of lead storage batteries)	▸ Damage to nervous system, blood, and kidneys ▸ Harmful to wildlife
Reactive Organic Gases (ROG) Precursor of ground-level ozone.	Combustion of fuels; petroleum transfer and storage; manufacture and use of solvents, paints, and adhesives	▸ Potential carcinogen (e.g., benzene) ▸ Potentially toxic to plants and animals

Sources: EPA 2001, Nadakavukaren 1995

CARBON MONOXIDE

Carbon monoxide is a product of incomplete combustion, principally from automobiles and other mobile sources of pollution. Industrial sources typically contribute less than 10 percent to ambient CO levels. Peak CO levels are very localized near areas of high motor vehicle traffic, and occur typically during winter months when calm conditions are common.

Carbon monoxide enters the bloodstream through the lungs by combining with hemoglobin, the substance that normally carries oxygen to the cells. It combines with hemoglobin much more readily than oxygen does, resulting in a drastic reduction in the amount of oxygen available to the cells. The symptoms of CO exposure at higher levels include dizziness, headaches, slowed reactions, and fatigue. Exposure is especially harmful to people with heart or lung disease, or anemia.

NITROGEN DIOXIDE

Nitrogen dioxide (NO_2) is a natural trace constituent of the troposphere. The major anthropogenic sources of NO_2 are combustion devices, such as boilers, gas turbines, and stationary and mobile reciprocating internal combustion engines. Combustion devices primarily emit nitric oxide (NO), which reacts in the atmosphere to form NO_2. The combined emissions of NO and NO_2 are referred to as NO_X, which are reported as equivalent NO_2. Because NO_2 reacts with ROG to form ozone and is also generated by the reactions that form photochemical smog, the concentrations of NO_2 in a particular geographical area may not be representative of the local NO_X emission sources. In the lower Sacramento Valley, NO_X is emitted primarily by motor vehicles (approximately 90–95 percent of the total), with the remaining percentage being emitted by industrial, residential, and commercial combustion sources. NO_2 concentrations tend to be higher close to major source areas and lower in downwind areas because of the symbiotic relationship that exists between O_3 and NO_2 levels.

Inhalation is the most common route of exposure to NO_2. Because NO_2 has relatively low solubility in water, its principal site of toxicity is the lower respiratory tract. The severity of the health effects depends mainly on the concentration inhaled and less on the duration of exposure. An individual may experience a variety of acute symptoms, including cough, difficulty breathing, vomiting, headache, and eye irritation during or shortly after exposure. After an interval of a few hours (usually 4–12 hours), an exposed individual may experience chemical pneumonitis or pulmonary edema with rapid breathing, breathing difficulties, cough, hemoptysis, cyanosis, chest pain, and rapid heartbeat. Severe, symptomatic NO_2 intoxication after acute exposure has been linked on occasion with prolonged respiratory impairment with symptoms of chronic bronchitis, and with decreased lung function.

SULFUR DIOXIDE

Sulfur dioxide (SO_2) is produced by the combustion of any fuel containing sulfur. The major health effects of SO_2 are on the upper respiratory tract. Only a small portion of inhaled SO_2 penetrates the lower respiratory tract because it is water soluble. Sulfur dioxide is a respiratory irritant with bronchoconstriction occurring with inhalation of SO_2 at 5 ppm or more. On contact with the moist mucous membranes, SO_2 produces sulfurous acid, which is a direct irritant. Concentration rather than duration of the exposure is the more important determinant of respiratory effects. High concentrations of SO_2 may cause edema of the lungs or glottis and can produce respiratory paralysis.

8.2 REGULATORY BACKGROUND

FEDERAL AIR QUALITY MANAGEMENT

At the federal level, the U.S. Environmental Protection Agency (EPA) has been charged with implementing national air quality programs. EPA air quality mandates are drawn primarily from the federal Clean Air Act (CAA), which was signed into law in 1970. Congress substantially amended the CAA in 1977 and again in 1990.

The CAA required EPA to establish the national ambient air quality standards (NAAQS), and to also establish deadlines for their attainment. Two types of NAAQS have been established: primary standards, which protect public health, and secondary standards, which protect public welfare from non-health-related adverse effects, such as visibility restrictions.

The CAA Amendments of 1990 made major changes in deadlines for attaining NAAQS and in the actions required of areas of the nation that exceeded these standards. Under the CAA, state and local agencies in areas that exceed the NAAQS are required to develop and implement air pollution control plans designed to achieve and maintain the NAAQS established by EPA. States may also establish their own standards, provided that state standards are at least as stringent as the NAAQS. California has established California ambient air quality standards (CAAQS) pursuant to California Health and Safety Code §39606(b) and its predecessor statutes. The NAAQS and CAAQS are presented in Table 8-2.

The CAA requires states to develop an air quality control plan referred to as the State Implementation Plan (SIP). The SIP contains the strategies and control measures that California will use to attain the NAAQS. EPA approved the California SIP in September 1996. The SIP became effective on February 7, 1997. Pursuant to the recently adopted SIP, the State of California will strive for compliance with federal O_3 standards by year 2010 through provisions that would seek to reduce pollution using a combination of performance standards and market-based programs to speed the introduction of cleaner technology and expand compliance flexibility (CARB 2002).

STATE OF CALIFORNIA AIR QUALITY MANAGEMENT

CARB is the agency responsible for coordination and oversight of state and local air pollution control programs and for implementing the California Clean Air Act (CCAA) of 1988.

The CCAA requires that all air districts in the state endeavor to achieve and maintain CAAQS by the earliest practical date. The CCAA mandates that districts focus particular attention on reducing emissions from transportation and areawide emission sources, and the act provides districts with new authority to regulate indirect sources. Each district plan is to achieve a 5 percent annual reduction, averaged over consecutive 3-year periods, in districtwide emissions of each nonattainment pollutant or its precursors. Air districts in violation of CAAQS are required to prepare an Air Quality Attainment Plan (AQAP) that includes measures for attaining the CCAA mandates.

Table 8-2
Ambient Air Quality Standards

California[1]		National[2]	
Air Pollutant	Concentration	Primary (>)	Secondary (>)
Ozone (O_3)	0.09 ppm, 1-hr avg	0.12 ppm, 1-hr avg 0.08 ppm, 8-hr avg[3]	0.12 ppm, 1-hr avg 0.08 ppm, 8-hr avg[3]
Carbon Monoxide (CO)	9 ppm, 8-hr avg 20 ppm, 1-hr avg	9 ppm, 8-hr avg 35 ppm, 1-hr avg	9 ppm, 8-hr avg 35 ppm, 1-hr avg
Nitrogen Dioxide (NO_2)	0.25 ppm, 1-hr avg	100 $\mu g/m^3$ annual	100 $\mu g/m^3$ annual
Sulfur Dioxide (SO_2)	0.04 ppm, 24-hr avg 0.25 ppm, 1-hr avg	0.03 ppm, annual avg 0.14 ppm, 24-hr avg	0.5 ppm, 3-hr avg
Suspended Particulate Matter (PM_{10})	30 $\mu g/m^3$ annual geometric mean 50 $\mu g/m^3$, 24-hr avg	50 $\mu g/m^3$ annual arithmetic mean 150 $\mu g/m^3$, 24-hr avg	50 $\mu g/m^3$ annual arithmetic mean 150 $\mu g/m^3$, 24-hr avg
Suspended Particulate Matter ($PM_{2.5}$)	--	15 $\mu g/m^3$ annual arithmetic mean 65 $\mu g/m^3$, 24-hr avg	15 $\mu g/m^3$ annual arithmetic mean 65 $\mu g/m^3$, 24-hr avg
Lead (Pb)	1.5 $\mu g/m^3$, 30-day avg	1.5 $\mu g/m^3$ calendar quarter	1.5 $\mu g/m^3$ calendar quarter
Oxides of Sulfur (SO_X)	25 $\mu g/m^3$, 24-hr avg	--	--
Hydrogen Sulfide (H_2S)	0.03 ppm, 1-hr avg	--	--
Vinyl Chloride	0.01 ppm, 24-hr avg	--	--
Visibility Reducing Particles	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.	--	--

1 California standards for ozone, carbon monoxide, sulfur dioxide (1-hour), suspended particulate matter (PM_{10}), and visibility reducing particles are values that are not to be exceeded. The sulfur dioxide (24-hour), sulfates, lead, hydrogen sulfide, and vinyl chloride standards are not to be equaled or exceeded.

2 National standards, other than ozone and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.

3 The 0.12 ppm 1-hour standard will not be revoked in a given area until that area has achieved 3 consecutive years of air quality data meeting the 1-hour standard.

ppm = parts per million by volume
$\mu g/m^3$ = micrograms per cubic meter
Source: CARB 2002

REGIONAL AIR QUALITY MANAGEMENT

The project site is located in western Placer County and southern Yuba County, which lie within the southern portion of the Sacramento Valley Air Basin, referred to as the Sacramento nonattainment region. The Sacramento nonattainment region consists of five separate air pollution control districts: El Dorado, Feather River, Placer, Sacramento Metropolitan, and Yolo-Solano. The five districts and the Sacramento Area Council of Governments worked together to develop the required regional ozone attainment plan. The governing boards of each district had to adopt the regional plan before it could be submitted to EPA. The approval of the regional plan by each district occurred between November 3, 1994, and December 20, 1994.

The attainment strategy contained in the regional attainment plan emphasizes NO_X reductions to the extent possible because modeling results indicate that NO_X reductions are more effective in reducing ambient ozone concentrations, on a tonnage basis. The attainment strategy for the Sacramento region relies heavily on mobile-source NO_X reductions. The NO_X inventory for the region is about 90 percent mobile source, and additional reductions from mobile sources are therefore critical for attainment. At the same time, new ROG controls are proposed for source categories such as consumer products, solvents, and coatings, as well as from mobile sources. New state and federal emissions standards for heavy-duty vehicles and off-road engines will provide a portion of the reductions needed to reach attainment.

In addition, both the FRAQMD and the PCAPCD have adopted new source-review rules. The purpose of these rules is to provide for the review of new and modified stationary sources of air pollutants. The rules establish thresholds and provide mechanisms, including the application of best available control technology and emission offsets, to ensure that construction and modification of stationary emission sources do not interfere with the attainment or maintenance of ambient air quality.

ATTAINMENT STATUS DESIGNATIONS

As discussed above, CARB is required to designate areas of the state as Attainment, Nonattainment, or Unclassified for CAAQS, in accordance with the CCAA. An Attainment designation for an area signifies that pollutant concentrations did not violate the standard for that pollutant in that area. A Nonattainment designation indicates that a pollutant concentration violated the standard at least once, excluding those occasions when a violation was caused by an exceptional event, as defined in the criteria. An Unclassified designation signifies that data do not support either an attainment or nonattainment status. The CCAA divides districts into moderate, serious, and severe air pollution categories, with increasingly strict control requirements mandated for each.

EPA designates areas for O_3, CO, and NO_2 as either "Does not meet the primary standards," "Cannot be classified," or "Better than national standards." For SO_2, areas are designated as "Does not meet the primary standards," "Does not meet the secondary standards," "Cannot be classified," or "Better than national standards." In 1991, new Nonattainment designations were assigned to areas that had previously been classified as Group I, II, or III based on the likelihood that they would violate the national PM_{10} standards. All other areas are designated Unclassified.

The Patterson mine site is located in western Placer County and southern Yuba County, within the Sacramento Valley Air Basin. The existing Patterson Sand and Gravel plant is located within the jurisdiction of the PCAPCD. Portions of the proposed expansion area are within the jurisdiction of the PCAPCD as well as the FRAQMD. Western Placer County and Yuba County are both designated Nonattainment for state and federal ozone standards and Nonattainment for state PM_{10} standards. The attainment status designations for the recently adopted $PM_{2.5}$ NAAQS have not yet been determined.

AMBIENT AIR QUALITY MONITORING

Air pollutant concentrations are measured at several monitoring stations in Placer County. The Auburn–Dewitt–C Avenue, Rocklin–Rocklin Road, and Roseville–North Sunrise Boulevard monitoring stations are the closest in proximity to the proposed project site with sufficient data to meet EPA and/or CARB criteria for quality assurance. Table 8-3 provides a summary of the air quality monitoring data obtained from these stations for the past 4 years of available data (2000–2003). As indicated in Table 8-4, state and federal standards for O_3, as well as the state standard for PM_{10}, have been exceeded on several occasions over the past 4 years of available data. The NO_X, CO, and federal $PM_{2.5}$ and PM_{10} standards were not exceeded at any of the monitoring stations during this period.

Table 8-3
Summary of Annual Air Quality Data

	2000	2001	2002	2003
OZONE (O_3)[1]				
Auburn–Dewitt–C Avenue Air Quality Monitoring Station				
Maximum Concentration (1-hr/8-hr avg.)	0.12/0.11	0.12/0.11	0.14/0.12	0.12/0.11
Number of Days State Standard Exceeded	22	22	16	14
Number of Days Federal 1-hr/8-hr Standard Exceeded	0/21	0/21	3/15	0/11
Rocklin–Rocklin Road Air Quality Monitoring Station				
Maximum Concentration (1-hr/8-hr avg.)	0.12/0.10	0.13/0.10	0.14/0.11	N/A
Number of Days State Standard Exceeded	16	18	21	N/A
Number of Days Federal 1-hr/8-hr Standard Exceeded	0/8	1/8	2/15	N/A
Roseville–North Sunrise Boulevard Air Quality Monitoring Station				
Maximum Concentration (1-hr/8-hr avg.)	0.13/0.10	0.12/0.10	0.13/0.11	0.13/0.11
Number of Days State Standard Exceeded	13	13	2	1
Number of Days Federal 1-hr/8-hr Standard Exceeded	0/9	0/9	2/11	1/5
CARBON MONOXIDE (CO)				
Roseville–North Sunrise Boulevard Air Quality Monitoring Station				
Maximum Concentration (1-hr/8-hr avg.)	3.2/1.5	3.1/1.90	4.6/2.81	2.1/1.59
Number of Days State Standard Exceeded	0	0	0	0
Number of Days Federal 1-hr/8-hr Standard Exceeded	0	0	0	0
NITROGEN DIOXIDE (NO_2)				
Roseville–North Sunrise Boulevard Air Quality Monitoring Station				
Maximum Concentration (1-hr avg.)	0.082	0.09	0.08	0.08
Annual Average (ppm)	0.016	0.015	0.016	0.014
Number of Days State Standard Exceeded	0	0	0	0

Table 8-3 Summary of Annual Air Quality Data				
SUSPENDED PARTICULATE ($PM_{2.5}$)				
Roseville–North Sunrise Boulevard Air Quality Monitoring Station				
Maximum Concentration (Daily)	N/A	49	53	30
Number of Days Federal Standard Exceeded (Measured/Calculated)	N/A	0	0	0
SUSPENDED PARTICULATE (PM_{10}) [2]				
Rocklin-Rocklin Road Air Quality Monitoring Station				
Maximum Concentration (Daily)	46	57	36	n/a
Number of Days State Standard Exceeded (Measured/Calculated)	0/0	2/12	0/0	n/a
Number of Days Federal Standard Exceeded (Measured/Calculated)	0	0	0	n/a
Roseville–North Sunrise Boulevard Air Quality Monitoring Station				
Maximum Concentration	58	59	58	33
Number of Days State Standard Exceeded (Measured/Calculated)	1	4	1	0
Number of Days Federal Standard Exceeded (Measured/Calculated)	0	0	0	0

1 EPA is phasing out and replacing the previous 1-hour primary ozone standard (health-based) with a new 8-hour standard. The federal 1-hour ozone standard (0.12 ppm) will not be revoked in a given area until that area has achieved 3 consecutive years of air quality data meeting the 1-hour standard.

2 Measured days are those days that an actual measurement was greater than the applicable standard. Measurements are typically collected every 6 days. Calculated days are the estimated number of days that a measurement would have been greater than applicable standards had measurements been collected daily. The number of days above the standard is not necessarily the number of violations of the standard for the year.

ppm = parts per million by volume
$\mu g/m^3$ = micrograms per cubic meter
N/A = no data available

Sources: CARB 2004, EPA 2004

TOXIC AIR CONTAMINANTS

Toxic air contaminants (TACs) include those air pollutants that are believed to result in an increase in mortality or serious illness, or that may pose a present or potential hazard to human health. Health effects commonly associated with TACs include cancer, birth defects, neurological damage, damage to the body's natural defense system, and diseases that lead to death. TACs can be separated into carcinogens and noncarcinogens based on the nature of the physiological degradation associated with exposure to the pollutant. For regulatory purposes, carcinogens are assumed to have no safe threshold below which health impacts will not occur. Noncarcinogenic TACs differ in that there is generally assumed to be a safe level of exposure below which no negative health impact is believed to occur. These levels are determined on a pollutant-by-pollutant basis.

There are hundreds of different types of TACs, with varying degrees of toxicity. Sources of TACs are most commonly associated with industrial processes, such as petroleum refining or chrome plating operations; commercial operations, such as gasoline stations and dry cleaning establishments; and motor vehicle exhaust. TACs are regulated through implementation of federal and state laws. Federal law uses the term “hazardous air pollutants” (HAPs) to refer to the same types of compounds referred to as TACs under state law. Both terms encompass essentially the same compounds. For purposes of this report, “TACs” will be used when referring to these pollutants. It is important to note that TACs are not considered criteria pollutants in that the CAA and CCAA do not address them specifically through the setting of NAAQS or CAAQS. However, enforcement of the NAAQS or CAAQS for the control of criteria pollutants, such as ozone and particulate matter, can result in reducing airborne emissions of TACs. The following is a summary of the major current federal and state regulations and programs for controlling TAC emissions.

Extended exposure to diesel exhaust can result in cancer, respiratory effects, and other health problems, and longer exposure periods can increase the risk of contracting diesel-related health problems. Diesel exhaust contains hundreds of constituent chemicals, dozens of which are recognized human toxicants, carcinogens, reproductive hazards, or endocrine disruptors.[1] More than 40 chemicals in diesel exhaust are considered toxic air contaminants by the State of California, including known carcinogens such as benzene, arsenic, dioxins, and formaldehyde.[2] Many studies have shown that diesel exhaust causes mutations in chromosomes and damage to DNA, processes which are believed to be important in the causation of cancer.[3]

Other components, such as toluene and dioxins, are known reproductive toxicants.[4] Fine particles from diesel exhaust aggravate respiratory illnesses such as bronchitis, emphysema, and asthma which are associated with premature deaths from cardio-pulmonary disorders.[5] A study published by the Health Effects Institute reports that more than 98 percent of the total number of particles in diesel exhaust are less than 1 micron in size.[6] Small particles, such as those in diesel exhaust, are particularly hazardous because they penetrate deeper into the recesses of the lungs, and tend to remain in the lungs and surrounding lymph nodes rather than being cleared efficiently from the body.[7]

NATIONAL EMISSIONS STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Title III of the CAA requires EPA to promulgate national emissions standards for hazardous air pollutants (NESHAP) for certain categories of sources that emit one or more pollutants identified as HAPs. Emission standards may be different between “major sources” and “area sources” of TACs. (Major sources are defined as stationary sources with potential to emit more than 10 tons per year [tpy] of any TAC or more than 25 tpy of any combination of TACs; all other sources are considered area

[1] For a complete list, see Krieger, et al., *Proposed Identification of Diesel Exhaust as a Toxic Air Contaminant, Part A: Exposure Assessment.* Technical Support Document, Public Comment And SRP Version, February 1998.

[2] Cal EPA, *Chemicals Known to the State to Cause Cancer or Reproductive Toxicity*, Revised May 1, 1997.

[3] Mauderly JL. Diesel Exhaust in Lippman M. (ed.) *Environmental Toxicants: human exposures and their health effects.* Van Nostrand Reinhold, New York, 1992

[4] Solomon, Gina M., Todd R. Campbell, Tim Carmichael, Gail Ruderman Feuer and Janet S. Hathaway. *Exhausted by Diesel: How America's Dependence on Diesel Engines Threatens Our Health.* 1998 (April). Natural Resources Defense Council. New York, NY.

[5] Shprentz D, "Breathtaking: Premature Mortality Due to Particulate Air Pollution in 239 American Cities", Natural Resources Defense Council, New York, May 1996, pp. 13-32.

[6] Bagley, Susan T., et al. 1996. *Characterization of Fuel and Aftertreatment Device Effects of Diesel Emissions. Research Report* Number 76. Health Effects Institute, Topsfield, Massachussetts. September.

[7] Lippmann M, *Environmental Toxicants: Human Exposures and Their Health Effects*, Van Nostrand Reinhold, New York, 1992. P. 16-17.

sources.) The emission standards are to be promulgated in two phases. In the first phase (1992–2000), EPA developed technology-based emission standards designed to produce the maximum emission reduction achievable. These standards are generally referred to as requiring maximum achievable control technology. For area sources, the standards may be different, based on generally available control technology. In the second phase (2001–2008), EPA is required to promulgate health risk–based emissions standards where such standards are deemed necessary to address risks remaining after implementation of the technology-based NESHAP standards.

The CAA Amendments of 1990 to the CAA required EPA to promulgate vehicle or fuel standards containing reasonable requirements to control toxic emissions, applying at a minimum to benzene and formaldehyde. Performance criteria were established to limit mobile source emissions of toxics, including benzene, formaldehyde, and 1,3-butadiene. In addition, §219 of the CAA Amendments of 1990 required the use of reformulated gasolines in selected U.S. cities (those with the most severe ozone nonattainment conditions) to further reduce mobile-source emissions, including toxics.

THE TANNER TOXICS ACT (ASSEMBLY BILL 1807)

The Tanner Toxics Act established the California toxic air contaminant control program (Assembly Bill [AB] 1807, California Health and Safety Code §39666 *et seq*.) to identify and control TACs. Under the Tanner Toxics Act, CARB is required to identify a substance as a TAC based on the review of the scientific data and the recommendations by both the Office of Environmental and Health Hazard Assessment (OEHHA) and the Scientific Review Panel. After designation, CARB investigates appropriate measures to limit emissions of the TACs. These measures may include emission limitations, control technologies, operation and maintenance requirements, closed system engineering, cost, or substitution of compounds. CARB then prepares a report on the appropriate degree of regulation and adopts air toxics control measures. These control measures are the minimum regulations that must be imposed by each of the local air districts in the form of regulations. Districts must adopt rules that are at least as stringent as state rules.

AIR TOXICS "HOT SPOTS" INFORMATION AND ASSESSMENT ACT

The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588) is a state law enacted in 1987. The law requires certain facilities to submit information regarding emissions of more than 550 TACs to their local air pollution control districts. The act addresses public concerns that emissions from individual facilities might cause local concentration of air toxics "hot spots" at a level where individuals may be exposed to an excess risk of adverse health effects. The program requires facilities to notify all exposed persons if it is determined that there is a significant health risk. AB 2588 was amended in 1993 by Senate Bill (SB) 1731, Facility Toxic Air Contaminant Risk Reduction Audit and Plan. In accordance with SB 1731, local air districts are required to establish a program to reduce risks from existing facilities that are deemed to pose a significant health risk.

WATERS BILL (ASSEMBLY BILL 3205)

AB 3205 addresses sources of hazardous air pollutants near schools. AB 3205 requires new or modified sources of hazardous air emissions located within 1,000 feet of the outer boundary of a school to give public notice to the parents or guardians of children enrolled in any school located within 0.25 mile of the source and to each address within a 1,000-foot radius.

ODOROUS AIR EMISSIONS

The sensory perception of odors has four major dimensions: detectability, intensity, character, and hedonic tone. The odor detectability threshold consists of the detection threshold and recognition threshold. The detection threshold is the lowest concentration of an odor that will elicit a sensory response; at this concentration there is an awareness of the presence of an added substance, but not necessarily an odor sensation. The recognition threshold is the minimum concentration that is recognized by a population as having a characteristic odor quality. Odor intensity refers to the perceived strength of the odor sensation. Odor character is how the substance smells (e.g., fishy, rancid) or what it smells like (e.g., hay, sewer, turpentine, ammonia). Hedonic tone is a category judgment of the relative pleasantness or unpleasantness of the odor, and is influenced by factors such as subjective experience and frequency of occurrence. Each of these elements plays a role in the identification of odor impacts.

There are no requirements for the control of odors in federal, state, or local air quality regulations. Offensive odors rarely cause any physical harm; however, they still can be very unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and regulatory agencies. Odor impacts on residential areas and other sensitive receptors, such as daycare centers and schools, are of particular concern. Major sources of odor-related complaints by the general public commonly include wastewater treatment facilities, landfill disposal facilities, food processing facilities, agricultural activities, and various industrial activities (e.g., petroleum refineries, chemical and fiberglass manufacturing, and painting/coating operations).

SENSITIVE LAND USES AND RECEPTORS

One of the most important reasons for air quality regulations and standards is the protection of those members of the population who are most sensitive to the adverse health effects of air pollution, termed “sensitive receptors.” The term sensitive receptors refers to specific population groups, as well as the land uses where they would reside for long periods. Commonly identified sensitive population groups are children, the elderly, the acutely ill, and the chronically ill. Commonly identified sensitive land uses are residences, schools, playgrounds, childcare centers, retirement homes or convalescent homes, hospitals, and clinics.

Sensitive receptors located within the vicinity of the proposed project consist of single-family residential dwellings, located primarily to the south and east of the plant along Camp Far West Road. Within the town of Sheridan, sensitive receptors located along the existing haul route consist primarily of single-family residential units. The Sheridan Elementary School is also located approximately 525 feet north of the existing haul route.

8.3 ENVIRONMENTAL IMPACTS

As explained in Section 3.5, environmental impacts are defined by comparison to an appropriate baseline condition. For impacts that relate to changes in physical resources or the location of operations, the baseline is the existing setting at the time the latest NOP was released (early 2001). For impacts that relate to operational rates, such as the rate of production or the volume of truck traffic, the baseline is the highest rate season from 2000, the latest year when comprehensive data on operations and traffic are available and the second highest production rate year in the mine's history. This operational baseline is meant to serve as a reasonable representation of the practical capacity of the mine under its current permit, which is the baseline approach approved by the courts in previous relevant CEQA cases.

THRESHOLDS OF SIGNIFICANCE

The proposed project would have a significant impact relative to air quality if resultant increases in project-related emissions (in comparison to baseline conditions) would cause exceedance of the thresholds of significance recommended by either the PCAPCD or the FRAQMD. The thresholds of significance recommended by these agencies are summarized in Table 8-4.

Table 8-4
Recommended Thresholds of Significance, Placer County Air Pollution Control District and Feather River Air Quality Management District (lb/day)

	ROG	NO_X	PM_{10}	CO	SO_X
PCAPCD	82	82	82	None	82
FRAQMD	25	25	80	500[1]	80[1]

[1] Based on new source-review thresholds for application of best available control technology; FRAQMD Rule 10.1 (1993).
Sources: FRAQMD 1994, PCAPCD 2004

In addition to the above thresholds, the PCAPCD has determined that the proposed project would have a significant impact related to air quality if it would result in increased emissions or concentrations (in comparison to baseline conditions) and would do any of the following:

- violate any ambient air quality standard;
- contribute substantially to an existing or projected violation of an ambient air quality standard;
- expose sensitive receptors (i.e., individuals with respiratory diseases, the young, the elderly) to substantial pollutant concentrations;
- include operational TAC emissions that exceed or contribute to an exceedance of the PCAPCD's recommended action level for cancer risk (10 in a million) for the maximally exposed individual (MEI) or chronic and acute hazard index risk levels of one or higher for the MEI;
- result in a frequent exposure of members of the public to objectionable odors.

METHODOLOGY

Emissions rates for existing stationary equipment and fugitive dust sources were derived primarily from engineering calculations performed by the PCAPCD in permitting a change in stationary equipment in 1998. Emissions rates for off-highway equipment and the proposed asphalt batch plant were based on emission factors obtained from EPA AP-42 and the Sacramento Metropolitan Air Quality Management District (SMAQMD) ROADMOD spreadsheet, as well as activity data/production rates supplied by the applicant. Exhaust emissions rates for on-highway vehicles were calculated using emission factors derived from the most current EMFAC emission model, at the time modeling was conducted. Vehicle miles traveled for on-highway vehicles were based on data obtained from the traffic analysis prepared for this project.

Air dispersion modeling using the EPA-approved ISCST3 was conducted in 2002 for both existing and proposed project conditions to determine predicted concentrations in the vicinity of the project site and the existing haul route. For dispersion modeling purposes, most facility and on-highway hauling operations were assumed to occur during existing operating hours between 6 a.m. and 5 p.m. Operating hours for the existing diesel-powered water pump were assumed to be 5 a.m.–5 p.m. daily. The proposed asphalt batch plant was assumed to operate 24 hours per day. On-highway truck traffic levels were based on the highest daily truck trips estimated to occur under the AAPR scenario, obtained from the traffic analysis prepared for this project. Traffic levels were based on an annual production rate of 1.5 million tons for existing operations and a proposed AAPR of 1.25 million tons for the proposed project. On-highway truck volumes used in the dispersion modeling are summarized in Table 8-5.

Table 8-5
On-Highway Truck Traffic with the Average Annual Production Rate

Averaging Period	Existing	Proposed Project
Hour	128	105
Day	1,126	920
Annual	134,000	107,500

Source: Sierra Research 2002a

The dispersion modeling was originally conducted in 2002. Subsequently, in November 2003, the applicant submitted a revised project application that included modifications to the proposed project. The changes to the proposed project included revisions to the proposed hours of operations, modifications to the phasing order and boundaries of Phases 2 and 3, changes in the topsoil stockpile location during Phase 6, and revisions to the proposed mining and reclamation plan in the eastern portion of Phase 1, south of the Bear River (refer to Section 2.4 for the current project description). Predicted truck traffic volumes for existing and proposed project conditions under the AAPR scenario (Table 8-5) did not changed.

The proposed mining and reclamation plan for which the dispersion modeling was prepared is substantially similar to the project that is currently proposed by the applicant. The results of the dispersion modeling, therefore, have been included in this analysis because they are useful in characterizing the relative contribution to predicted emission concentrations and associated risks attributable to the various onsite and offsite activities. Although the emission concentrations predicted by the dispersion modeling do not precisely calculate predicted emission concentrations from the currently proposed mine expansion project analyzed in this EIR, they provide a reasonable and adequate representation for environmental impact conclusions.

PROJECT IMPACTS

The potential air quality impacts of the proposed project have been analyzed for both the short-term and the long-term phases of the project. Short-term impacts on air quality refer to those associated with construction of the ancillary facilities, including the office building, asphalt batch plant, and extension of the levee. Long-term impacts include the daily onsite operational emissions associated with onsite mining and reclamation activities, and onsite processing of mined materials, as well as the onsite and offsite operation of motor vehicles.

Impact
8-1

Short-Term Increases in Regional Criteria Pollutants and Precursors*.* *Estimated increases in onsite short-term construction-related emissions of NO_X, and PM_{10} would exceed applicable thresholds. As a result, this impact is considered* ***significant****.*

Heavy construction is a source of short-term emissions that may have a substantial, temporary impact on local air quality. Short-term increases in emissions of regional criteria pollutants and their precursors are typically greatest during initial site preparation (e.g., land clearing, ground excavation, demolition), as these phases typically result in greater disturbance of soil and use of more pieces of large diesel-powered mobile equipment than other phases. Construction-generated emissions vary substantially from day to day, depending on the level of activity, the specific operations, and weather conditions.

Onsite construction activities associated with the proposed project include construction of the office building, scales, levee extension, and asphalt batch plant. Construction of these facilities would result in a short-term increase in regional emissions. Emissions would be associated primarily with site preparation activities, including site grading, the demolition of existing facilities, material handling, use of onsite equipment, and temporary increases in commute trips by construction workers and construction material delivery trips to and from the facility. Construction activities associated with each of the proposed facilities would be anticipated to occur before mining of the proposed mine expansion areas; as a result, each of the proposed improvements could potentially occur simultaneously. The following analysis assumes construction of all ancillary facilities occurring simultaneously. It should be noted, however, that the following analysis assumes that onsite equipment required for construction of the proposed facilities would be in addition to equipment typically used for normal operation of the facility. In actuality, initial site preparation activities would likely involve the use of existing onsite equipment; therefore, the net increase in daily emissions associated with construction of the proposed facilities would be less than indicated in Table 8-6. Daily watering activities already conducted at the plant would also help to reduce fugitive dust emissions. Short-term construction-generated emissions are summarized in Table 8-6.

FUGITIVE SOURCES OF PM_{10}

"Fugitive emissions" are generally defined as emissions that cannot reasonably pass through a stack, chimney, vent, or other functionally equivalent opening, such as emissions generated as a result of wind erosion, vehicle travel on unpaved surfaces, and material handling. The PM_{10} component of fugitive dust includes those particles that are small enough to reach the lungs when inhaled. The remainder is composed of large particles of dust that settle out rapidly on surfaces very near the source. These large particles (or visible dust) are easily filtered by human breathing passages and represent a nuisance, rather than a health concern.

Increases in airborne emissions of PM_{10} from fugitive sources would be associated primarily with the demolition of the existing facilities, disturbance of exposed graded surfaces, and wind erosion of soil storage piles. A large portion of emissions result from equipment traveling over unpaved roads at construction sites. As indicated in Table 8-6, estimated uncontrolled daily emissions of PM_{10} from fugitive sources would total approximately 312 pounds per day (lb/day).

ON-HIGHWAY MOBILE-SOURCE EMISSIONS

Construction employee trips are generated from commute trips to and from the work site, business trips throughout the day, and lunch trips. Offsite construction-related trips would result from the use of trucks hauling construction and demolition materials to and from the project site during construction. Assuming a maximum of 20 additional employee commute trips and 32 haul truck trips per day and average trip distances of 20 miles for employee trips and 50 miles for construction-related trips, vehicle exhaust emissions associated with these offsite trips would total approximately 2.2 lb/day of ROG, 57.1 lb/day of NO_X, 1.0 lb/day of PM_{10}, and 0.7 lb/day of SO_X (Table 8-6).

OFF-HIGHWAY MOBILE-SOURCE EMISSIONS

Exhaust emissions would result from the use of heavy-duty diesel machinery during the grading phase of project construction. Assuming six pieces of miscellaneous heavy-duty, diesel-powered construction equipment, each used an average of 6 hours per day, equipment exhaust emissions would total approximately 8.5 lb/day of ROG, 63.5 lb/day of NO_X, 3.1 lb/day of PM_{10}, and 1.6 lb/day of SO_X (Table 8-6). However, as previously mentioned, actual net increases in onsite mobile source emissions would likely be substantially less than the estimated totals presented in Table 8-6, because the proposed construction activities would likely use some existing operational equipment for initial site preparation and construction-related activities. In addition, ongoing dust control procedures currently employed at the processing plant (i.e., watering of exposed surfaces) would also help to reduce predicted fugitive dust emissions.

Table 8-6
Maximum Daily Onsite Construction Emissions [1]

	Pollutants (lb/day)			
	ROG	NO_X	PM_{10}	SO_X
Onsite Construction Activities				

Fugitive-Source Emissions [2]	--	--	312.24	--
Off-Highway Mobile-Source Emissions [3]	8.52	63.49	3.05	1.59
On-Highway Mobile-Source Emissions [4]	2.17	57.12	1.02	0.67
Total Construction Emissions:	10.69	120.61	437.71	2.25
PCAPCD Significance Threshold	82	82	82	82

[1] Construction-generated emissions were calculated assuming that initial site preparation activities for construction of all proposed facilities (e.g., office building, access roads, scales, asphalt batch plant) and demolition of existing structures would occur simultaneously, on any given day. Based on SMAQMD ROADMOD, v5.1, emission factors and methodologies for calculating short-term emissions, approved for use by the PCAPCD. Construction activities would be limited to PCAPCD jurisdiction. Construction emission calculations, including assumptions and emission factors, are presented in Appendix D.

[2] Assumes 0.5-acre storage pile, 2 acres actively disturbed, haul truck travel on unpaved surfaces, and 2,000 cubic feet of building demolition.

[3] Based on EMFAC2002 year 2004 emission factors. Assumes a total of 20 additional employee trips and 32 haul truck trips per day; 20-mile average employee commute trip length and 50-mile construction-related trip length.

[4] Assumes three pieces of heavy-duty diesel-powered construction equipment per acre of disturbance.

Source: EDAW 2004

As summarized in Table 8-6, daily increases in onsite emissions of NO_X, and PM_{10} would exceed the PCAPCD's recommended significance thresholds of 82 lb/day. Although actual emissions would likely be less than those indicated in Table 8-6, because of the use of existing onsite equipment and ongoing dust control procedures already employed at the processing plant, maximum daily construction-generated emissions would still be anticipated to exceed the significance thresholds recommended by the PCAPCD. As a result, this impact is considered significant.

Impact **8-2**

Long-term Increases in Regional Criteria Pollutants and Ozone Precursors. *Operation of the proposed project would result in emissions of ROG, CO, and PM_{10} that would exceed applicable thresholds and the proposed project's emissions would increase from some sources (i.e., asphalt plant and longer onsite haul of materials from some mine phases) compared to baseline conditions. As a result, this impact is considered* ***significant****.*

Long-term increases in regional criteria pollutants and ozone precursors attributable to the proposed mining operation would be associated primarily with the onsite generation of fugitive dust as a result of material handling and the onsite operation of stationary sources of emissions (e.g., diesel-powered generators and the proposed asphalt batch plant), as well as stationary-source and mobile-source emissions associated with the onsite and offsite operation of mobile equipment. Emissions generated by fugitive, stationary, and mobile sources attributable to the proposed project are discussed in more detail below.

FUGITIVE-SOURCE PM_{10} EMISSIONS

Mining and reclamation activities are a source of dust (PM_{10}) emissions that can have a substantial intermittent impact on local air quality. Fugitive dust emissions are associated with land clearing, ground excavation, cut and fill operations, and heavy equipment travel on unpaved roadways. Dust emissions vary substantially from day to day depending on the level of activity, the specific operations, and weather conditions.

The mining and reclamation activities of the proposed mine expansion project would involve excavation, removal, and storage of topsoil and subsoil layers from the project site; removal of sand and gravel deposits; onsite transport of excavated materials; processing of excavated materials in the processing area; transport of materials from the processing area; subsequent grading and reapplication of blended topsoil and subsoil layers to mined areas for reclamation purposes; and land disturbance for revegetation. Operation of the existing processing plant, including the rock crushing plant, wash plant, and powerscreen, result in additional fugitive emissions of PM_{10}.

Table 8-7 includes a summary of fugitive dust (PM_{10}) generation rates associated with mining and reclamation activities for the proposed expansion phases based on existing emissions limitations established by the PCAPCD. In comparison to existing permit emissions limitations, overall daily increases in onsite fugitive dust generation would be associated primarily with the increased haul distances required to transport mined material from the proposed expansion areas to the processing plant. Because the proposed project would result in an overall reduction in the AAPR from 1.5 mty to 1.25 mty, the maximum daily emissions of PM_{10} from other fugitive sources (e.g., storage piles, material handling, and processing) would be anticipated to decrease in comparison to existing permitted (baseline) conditions.

It is important to note that the emissions estimates presented in Table 8-7 represent maximum daily onsite emissions and therefore should not be considered a comparison of average daily emissions rates associated with the existing and proposed AAPR, which is proposed to decrease with project implementation. In comparison to existing permitted (baseline) conditions, the maximum increase in emissions associated with the onsite hauling of mined material would occur during Phase 4 of the proposed expansion, the phase farthest from the processing plant. Overall, the maximum daily net increase in PM_{10} emissions resulting from increased haul truck distances would vary by phase, depending on distance from the processing area. The maximum anticipated increase in PM_{10} emissions would be approximately 148.61 lb/day during mining Phase 4, assuming continued implementation and compliance with PCAPCD requirements for the control of onsite fugitive dust emissions.

Table 8-7 Maximum Daily Onsite Fugitive Source PM_{10} Emissions [1]							
ACTIVITIES	Fugitive Source PM_{10} Emissions (lb/day)						
	Baseline	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Haul Truck Travel on Unpaved Roads [2]	15.47	82.04	105.48	98.45	164.08	128.92	42.19
Material Handling and Loading [3]	1.68	1.68	1.68	1.68	1.68	1.68	1.68
Wind Erosion of Active Storage Piles [3]	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Material Processing Plant [3]	53.7	53.7	53.7	53.7	53.7	53.7	53.7
Remaining Sources [3]	3.49	3.49	3.49	3.49	3.49	3.49	3.49
Total Emissions	74.6	141.17	164.61	157.58	223.21	188.05	101.32
Net Increase (In Comparison to Baseline):		66.57	90.01	82.98	148.61	113.45	26.72
Significance Threshold [4]:		80					

[1] Assumes that grading, mining, and reclamation activities would be occurring simultaneously. Emissions estimates are based on continued compliance with PCAPCD permit requirements and continued implementation of measures for the control of onsite fugitive dust emissions, as required by the PCAPCD. Reclamation of the settling pond in the northwestern portion of Phase 1 is not currently permitted, but would occur during reclamation of Phase 1.
[2] For calculation of maximum daily emissions, estimated emissions associated with vehicle travel on unpaved haul roads are based on the maximum estimated haul distances between the existing processing area and proposed mine expansion areas. Actual daily emissions will vary depending on various factors, including the actual location of mining within the proposed processing area, daily mining/processing rates, and the type of roadway base material and mitigation measures applied.
[3] Based on existing permit limitations and continued implementation of onsite fugitive dust control measures in accordance with existing permit requirements.
[4] Based on the more conservative significance threshold recommended by the FRAQMD.
Refer to Appendix D for detailed emissions calculations.
Source: EDAW 2004

REGIONAL MOBILE-SOURCE AND STATIONARY-SOURCE EMISSIONS

Implementation of the proposed mine expansion project would generate emissions associated with the use of onsite equipment during mining and reclamation activities, as well as mobile-source emissions associated with vehicles traveling to and from the plant. There would be additional emissions from onsite stationary sources associated with the continued operation of the diesel-powered water pump and future operation of the proposed asphalt batch plant. Estimated mobile-source and stationary-source emissions associated with existing and proposed project conditions are summarized in Table 8-8.

Table 8-8 Maximum Daily Mobile-Source and Stationary-Source Emissions							
Source/Pollutant	Emissions (lb/day)						
	Existing	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Reactive Organic Gases (ROG)							
Processing Plant	5.33	5.33	5.33	5.33	5.33	5.33	5.33
Batch Plant	--	428.4	428.4	428.4	428.4	428.4	428.4
Offsite On-Highway Vehicles	109.00	89.17	79.39	36.88	23.25	20.84	20.84

Source/Pollutant	Emissions (lb/day)						
	Existing	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
Onsite Off-Highway	62.34	62.34	62.68	62.89	62.89	62.89	62.89
Onsite On-Highway Vehicles	1.27	1.04	0.93	0.43	0.30	0.24	0.24
Total Emissions:	177.94	586.28	576.72	533.92	520.16	517.69	517.69
Oxides of Nitrogen (NO_X)							
Processing Plant	25.05	25.05	25.05	25.05	25.05	25.05	25.05
Batch Plant	--	199.50	199.50	199.50	199.50	199.50	199.50
Offsite On-Highway Vehicles	2921.24	2387.8	2096.4	718.35	239.76	159.60	159.60
Onsite Off-Highway	425.38	425.38	348.98	213.99	213.99	213.99	213.99
Onsite On-Highway Vehicles	15.22	12.48	10.96	3.77	2.72	5.6	5.6
Total Emissions:	3386.99	3050.2	2680.9	1160.6	681.02	598.98	598.98
Particulate Matter (PM_{10})							
Processing Plant	55.83	55.83	55.83	55.83	55.83	55.83	55.83
Batch Plant	--	153.62	153.62	153.62	153.62	153.62	153.62
Offsite On-Highway Vehicles	51.75	42.31	35.48	15.87	8.39	7.20	7.20
Onsite Off-Highway	21.88	21.88	17.85	11.48	11.48	11.48	11.48
Onsite On-Highway Vehicles	0.58	0.47	0.40	0.17	0.10	0.09	0.09
Total Emissions:	130.04	274.11	263.18	236.97	229.42	218.22	228.22
Oxides of Sulfur (SO_X)							
Processing Plant	3.58	3.58	3.58	3.58	3.58	3.58	3.58
Batch Plant	0	21.95	21.95	21.95	21.95	21.95	21.95
Offsite On-Highway Vehicles	34.20	27.95	27.95	3.14	3.14	3.14	3.14
Onsite Off-Highway	11.82	11.82	11.82	11.82	11.82	11.82	11.82
Onsite On-Highway Vehicles	0.12	0.10	0.10	0.01	0.01	0.01	0.01
Total Emissions:	49.72	65.39	65.39	40.50	40.50	40.50	40.50
Carbon Monoxide (CO)							
Processing Plant	11.42	11.42	11.42	11.42	11.42	11.42	11.42
Batch Plant	0	372.40	372.40	372.40	372.40	372.40	372.40
Offsite On-Highway Vehicles	445.03	369.25	324.48	162.71	120.64	111.58	111.58
Onsite Off-Highway	352.01	352.01	312.84	201.88	201.88	201.88	201.88
Onsite On-Highway Vehicles	17.97	14.82	5.13	2.59	1.93	1.79	1.79
Total Emissions:	826.44	1119.89	1026.2	751.00	708.27	699.07	699.07

Processing plant emissions include those associated with the operation of the diesel-powered water pump (Sierra Research 2002a). Batch plant emissions are based on manufacturer's emission data obtained from the EPA AP-42. Mobile-source emissions were calculated using emission factors for off-road and on-road sources available through year 2010 and 2020, respectively, based on emission rates obtained from the SMAQMD and EMFAC7G computer model. Reclamation of the settling pond in the northwestern portion of Phase 1 is not currently permitted, but would occur during reclamation of Phase 1.

Refer to Appendix D for detailed emissions calculations.

Sources: EPA 1995, SMAQMD 2002, Sierra Research 2002a, EDAW 2004

Because operation of stationary sources would be required to comply with the existing PCAPCD permit, increases in stationary-source emissions were not anticipated to increase during future mining phases. It is important to note that the emissions estimates presented in Table 8-8 represent maximum daily onsite emissions for comparison to the maximum daily threshold limits recommended by the PCAPCD and the FRAQMD, and therefore should not be considered to be a comparison of average daily emissions rates anticipated to occur under the existing and proposed AAPR scenarios. Because the proposed project would not result in the operation of any additional major electric-powered equipment and would result in a net reduction in the AAPR, the proposed project would not be anticipated to result in an increase in indirect source emissions from energy use or offsite utility emissions attributable to the project. As a result, emissions associated with offsite energy production attributable to the proposed project have not been included in this analysis.

As depicted in Table 8-8, implementation of the proposed project would result in increased emissions of ROG, PM_{10}, SO_X, PM_{10} , and CO, primarily attributable to the operation of the proposed asphalt batch plant. Because of overall reductions in processing rates, total offsite haul truck trips associated with the proposed project are anticipated to decrease, on average, by approximately 90 trips/day, in comparison to existing conditions (see Chapter 7, Traffic). In comparison to existing operations, reductions in daily haul truck trips would result in corresponding reductions in mobile-source NO_X emissions.

TOTAL LONG-TERM OPERATIONAL EMISSIONS

A comparison of total project-related emissions anticipated to occur under near-term (Phase 1) conditions, in comparison to existing permit (baseline) conditions, is shown in Table 8-9. Phase 1 includes ongoing mining of the currently permitted mining areas, plus reclamation of the pond in the northern portion of the project site. As depicted, total emissions of ROG, PM_{10}, SO_X, and CO would increase, primarily attributable to the operation of the proposed asphalt batch plant. As discussed above, reductions in NO_X emissions would be attributable to reductions in haul truck trips resulting from corresponding reductions in the AAPR. In general, mobile-source emissions occurring during future years are anticipated to decrease gradually because of continued improvements in mobile-source technology, fuel efficiency, and use of reformulated fuels. Nonetheless, the proposed project's sources of air pollutant emissions and their environmental effects are related to more complex issues than simply an overall reduction of average annual production rate or improvement in technology over time. Because the proposed project would result in emissions of ROG, PM_{10}, and CO that would exceed the significance thresholds recommended by both the PCAPCD and FRAQMD, and because increases in the proposed project's emissions would occur from some sources (i.e., the asphalt plant and longer on-site material haul for certain phases), this impact is considered significant according to CEQA requirements.

Table 8-9 Summary of Total Maximum Daily Operational Emissions					
	Emissions (lb/day)				
	ROG	NO_X	PM_{10}	CO	SO_X
Existing	177.94	3,386.89	204.64	826.44	49.72
Proposed Project [1]	586.28	3050.21	415.28	1119.89	65.39
Net Difference:	408.35	-336.68	210.64	293.46	15.67
PCAPCD Significance Thresholds	82	82	82	None	82
FRAQMD Significance Thresholds	25	25	80	500	80

[1] Represents the maximum daily emissions attributable to the proposed project, predicted to occur during near-term (Phase 1) conditions, in comparison to existing emissions (Table 8-8). Refer to Appendix D for detailed emissions calculations.

Source: EDAW 2004

Impact
8-3

<u>Localized Concentrations of Carbon Monoxide Emissions</u>. *Vehicle trips attributable to the proposed mine expansion project would generate CO, a mobile-source pollutant of local concern. However, western Placer and Yuba counties are in compliance with ambient air quality standards for CO, and CO concentrations are not projected to exceed ambient air quality standards at intersections affected by the proposed mine expansion project. Therefore, this impact is considered* ***less than significant****.*

The primary mobile-source criteria pollutant of local concern is carbon monoxide. Concentrations of CO are a direct function of vehicle idling time and, thus, traffic flow conditions. Transport of this criteria pollutant is extremely limited; CO disperses rapidly with distance from the source under normal meteorological conditions. Under certain meteorological conditions, however, CO concentrations close to a congested roadway or intersection may reach unhealthy levels, affecting local sensitive receptors (residents, school children, hospital patients, the elderly, etc.). Typically, areas of high CO concentrations, or "hot spots," are associated with roadways or intersections operating at unacceptable levels of service (LOS D or worse), or at receptors located near major stationary combustion sources.

Based on the traffic analysis prepared for this project (refer to Chapter 7, Traffic), conditions at roadway intersections affected by the proposed project would improve slightly because of predicted reductions in haul truck traffic. Affected intersections would continue to operate at an overall LOS A. As a result, localized concentrations of offsite mobile-source CO would not be anticipated to exceed applicable standards. As a result, localized increases in CO concentrations at offsite locations would be considered less than significant.

As discussed previously, onsite sources of CO emissions are associated primarily with the operation of off-road mining/reclamation equipment, haul trucks accessing the site, and the proposed asphalt batch plant. However, given that onsite mobile sources of CO emissions would not be attributable to a single location, emissions of CO would be widely dispersed throughout the project area. In addition, ambient CO concentrations within the area are relatively low, and there are no sensitive receptors located within approximately 2,000 feet of the proposed single major source of onsite CO emissions (i.e., the proposed asphalt batch plant); therefore, localized CO concentrations at the nearest receptor would not be anticipated to exceed applicable standards. As a result, this impact is considered less than significant.

Impact **8-4**

Localized Concentrations of Nitrogen Dioxide in the Vicinity of the Processing Plant. *Concentrations of NO_2 at nearby receptors could exceed either the California 1-hour ambient air quality standard or the NAAQS. As a result, this impact is considered* ***potentially significant****.*

In 2002, air dispersion modeling using the EPA-approved ISCST3 was conducted for both existing conditions and proposed project conditions (for the previously proposed project) for the purpose of determining predicted concentrations of NO_2 in the vicinity of the project site and nearby sensitive receptors. Most facility and on-highway hauling operations were assumed, for modeling purposes, to occur during existing operating hours between 6 a.m. and 5 p.m. Operating hours for the diesel-powered water pump were assumed to extend between 5 a.m. and 5 p.m. daily. The proposed asphalt batch plant was assumed to operate 24 hours per day.

Predicted NO_2 concentrations for existing conditions and proposed project conditions were computed by adding the modeled impacts from the proposed project to the highest background concentrations measured at the closest permanent monitoring station (i.e., Yuba City air quality monitoring station). The 10 highest 1-hour NO_X readings under each operating scenario were converted to equivalent NO_2 values by applying the ozone-limiting method. The predicted cumulative NO_2 impacts associated with existing conditions and proposed project conditions, assuming that operational hours were to remain consistent with existing operations, are presented in Table 8-10.

Based on the dispersion modeling conducted, NO_X impacts from onsite sources and related on-highway travel near the facility were estimated by the model to peak near the mining areas and aggregate processing areas within the facility. Elevated 1-hour NO_X concentrations were estimated to occur both north and south of the facility, with the peak values estimated to occur along the facility boundaries near the active mining areas. Although emissions of NO_2 would increase slightly in comparison to existing conditions, predicted concentrations would not exceed either the California 1-hour ambient air quality standard or the NAAQS. Again, it is important to note that predicted concentrations for the proposed project assume that the operational hours for the various onsite and offsite activities are consistent with existing hours of operation. Predicted NO_2 concentrations obtained from the dispersion modeling are presented in Table 8-10.

However, since completion of the dispersion modeling conducted in 2002, the proposed daily hours of operation have changed. As currently proposed, most processing and mining activities, including operation of the proposed asphalt batch plant, would occur between 5 a.m. and midnight, with the exception of operation of the crushing plant. Operation of the crushing plant would be limited to 7 a.m.–10 p.m. Material hauling would occur between 6 a.m. and 5 p.m., Monday through Friday, and 6 a.m.–noon on Saturdays. In addition, the NO_2 concentrations predicted during the dispersion modeling in 2002 were calculated through the year 2010, the predictive limit for off-highway equipment at the time modeling was conducted, and was limited to Phases 1–3. Mining activities occurring during subsequent years and in closer proximity to nearby receptors not included in the earlier dispersion modeling analysis (i.e., Phase 6) may result in further increases in NO_2 concentrations at nearby receptors that were not previously accounted for in the dispersion modeling. Although emissions of mobile-source NO_2 would be anticipated to decrease in future years, it is unclear whether continued reductions of mobile-source NO_2 along with the reduced hours of operation for the proposed asphalt batch plant (as currently proposed) would be sufficient to offset these potential increases in NO_2 concentrations. Consequently, because implementation of the proposed project would result in an increase in NO_2 concentrations at nearby receptors that could exceed state or federal standards, this impact is considered potentially significant.

Table 8-10
Maximum Cumulative Nitrogen Oxide Impacts[1]

Averaging Period	Modeled Impacts (µg/m³)	Highest Background Concentration (µg/m³)	Maximum NO_2 Impacts (µg/m³)	Ambient Air Quality Standards (µg/m³)	
				State	Federal
Existing					
1-Hour	242	160	402	470	
Annual	19.9	26.3	46.2		100
Proposed Project					
1-Hour	266	160	426	470	
Annual	45.6	26.3	71.9		100

[1] Based on dispersion modeling conducted in 2002 for phases occurring through year 2010; does not reflect subsequent changes in mine phasing, daily hours of operation, and emission rates. Predicted concentrations are based on the annual average processing rate. Assumes hours of operation of project-related activities would be consistent with existing hours of operation.

Source: Sierra Research 2002a

Impact
8-5

Localized Concentrations of PM_{10} in the Vicinity of the Processing Plant. *Implementation of the proposed project could result an increase in PM_{10} concentrations at nearby receptors that would exceed state or federal standards. Therefore, this impact is considered* ***potentially significant****.*

In 2002, air dispersion modeling using the EPA-approved ISCST3 model was conducted for both existing conditions and proposed project conditions (for the previously proposed project) for the purpose of determining predicted concentrations of PM_{10} in the vicinity of the project site and nearby sensitive receptors. Most facility and on-highway hauling operations were assumed, for modeling purposes, to occur during existing operating hours between 6 a.m. and 5 p.m. Operating hours for the diesel-powered water pump were assumed to extend between 5 a.m. and 5 p.m. daily. The proposed asphalt batch plant was assumed to operate 24 hours per day. The maximum PM_{10} impacts that would be experienced near the facility associated with operation of the existing and proposed project were computed by adding the modeled impacts from each of these operating scenarios to the highest background concentrations measured at nearby permanent monitoring station recommended for use by the PCAPCD (i.e., Lincoln PM_{10} monitoring station).

The maximum 24-hour and annual PM_{10} concentrations modeled for both existing conditions and proposed project conditions are summarized in Table 8-11. As indicated in Table 8-11, the maximum PM_{10} concentrations attributable to the proposed project are lower than those of the baseline operation, but would continue to exceed the federal 24-hour ambient air quality standard and the California

24-hour and annual ambient air quality standards. Based on the modeling conducted, the peak PM_{10} impacts from the proposed facility operation were found to occur adjacent to the facility boundaries and near the public roads used to access the facility. The sources that dominated these impacts were paved and unpaved road dust generated by the on-highway and onsite haul trucks transporting product and mined material within and near the facility.

Table 8-11
Maximum Cumulative PM_{10} Impacts[1]

Averaging Period	Modeled Impacts ($\mu g/m^3$)	Highest Background Concentration ($\mu g/m^3$)	Maximum PM_{10} Impacts ($\mu g/m^3$)	Ambient Air Quality Standards ($\mu g/m^3$)	
				State	Federal
Existing					
24-Hour	171	66	237	50	150
Annual	14.5	18.5	33	30	50
Proposed Project					
24-Hour	139	66	205	50	150
Annual	13.2	18.5	31.7	30	50

[1] Based on dispersion modeling conducted in 2002; does not reflect subsequent changes in mine phasing, daily hours of operation, and emission rates.
Source: Sierra Research 2002a

The maximum 24-hour PM_{10} impacts identified by source, as predicted to occur during mining of the proposed expansion areas located nearest sensitive receptors (i.e., Phases 1, 2, 3, and 6) are summarized in Table 8-12. Based on the modeling conducted in 2002, the results indicate that the maximum impact produced by all facility sources operating simultaneously is generally the same as that of the haul trucks operating on public roads when modeled separately. Only in the case of the Phase 6 mining scenario, where mining is occurring directly west of and adjacent to the site of highest PM_{10} impact, does a source other than haul truck travel contribute to the maximum estimated impact. The modeling suggests that for most phases, PM_{10} impacts at nearby receptors are being dominated by one source, road dust from haul trucks accessing the site.

Since completion of the dispersion modeling, the proposed daily hours of operation have changed. As currently proposed, most processing and mining activities, including operation of the proposed asphalt batch plant, would occur between 5 a.m. and midnight, with the exception of operation of the crushing plant. Operation of the crushing plant would be limited to 7 a.m.–10 p.m. Material hauling would occur between 6 a.m. and 5 p.m., Monday through Friday, and 6 a.m.–noon on Saturdays.

Table 8-12
24-Hour PM_{10} Concentrations Under Proposed Mining Phase Scenarios[1]

Source	Phase 1	Phase 2	Phase 3	Phase 6
Maximum PM_{10} Impacts ($\mu g/m^3$)				
Aggregate Processing Area	53.2	52.9	53.2	50.2
Mining Area	48.6	40.1	36.3	31.5
Asphalt Batch Plant	2.1	2.1	2.1	2.1
Diesel Pump	0.6	0.6	0.6	0.6
Haul Trucks on Public Roads	139.3	139.1	139.1	139.3
All Sources Combined	139.3	139.1	139.1	147
Maximum 24-hour PM_{10} Impacts at Combined Source Peak Impact Site ($\mu g/m^3$)				
Aggregate Processing Area	25.5	25.4	25.5	24.1
Mining Area	10.2	3.7	2.8	19.3
Asphalt Batch Plant	0.3	0.3	0.3	0.3
Diesel Pump	0.2	0.2	0.2	0.2
Haul Trucks on Public Roads	139.1	139.3	139.1	139.1
All Sources Combined	139.1	139.3	139.1	147

[1] Based on dispersion modeling conducted in 2002; does not reflect subsequent changes in mine phasing, daily hours of operation, and emission rates. Concentrations are not additive; based on annual average processing rates. Because of changes in the project that have occurred since completion of this analysis (i.e., changes in mine phasing and operating hours), the above concentrations may not be representative of the currently proposed project. Refer to Appendix D for modeling assumptions and results.
Source: Sierra Research 2002a

As previously discussed, the sources that dominated these impacts were paved and unpaved road dust generated by the on-highway and onsite haul trucks transporting product and mined material within and near the facility. Although daily mining rates and overall daily haul truck trips would not be anticipated to change substantially, in comparison to baseline conditions, increases in daily haul trips could potentially occur during maximum periods of production. As previously discussed, haul truck traffic on area roadways was determined to be the primary contributor to PM_{10} concentrations at nearby receptors. Because the proposed project would contribute to increased concentrations of PM_{10} that would exceed applicable standards, this impact is considered significant.

Impact
8-6

Particulate Deposition on Nearby Agricultural Crops. *The accumulation of dust on the leaves of nearby agricultural plants and orchards may result in reduced crop yields associated with decreased rates of plant photosynthesis and may affect the health of nearby sensitive plant species. This impact is considered* ***potentially significant****.*

Emissions of fugitive dust generated during project construction may also result in the transmission of dust to nearby agricultural crops and to orchards. The accumulation of dust on the leaves of nearby agricultural plants may result in reduced crop yields associated with decreased rates of plant photosynthesis. In addition, a repeated or long-term accumulation of dust on the leaves of plants may encourage the development or increased activity of spider mites (Britton 1998). Increased spider mite activity is most noticeable within approximately 100 feet downwind of dust-generating activities (Ballanti and Kasimatis 1997). The application of water or soil stabilizers (standard construction mitigation measures for the control of fugitive dust) is generally considered an effective method of reducing dust-related impacts on plants (Britton 1998, Ballanti and Kasimatis 1997). However, based on the PM_{10} dispersion modeling performed for the proposed project (Impact 8-5), implementation of all feasible control measures is not anticipated to mitigate PM_{10} emissions to levels at which no significant impact on nearby plants would occur. In addition, the proposed expansion would increase the acreage of agricultural land (i.e., orchards) susceptible to particulate deposition, particularly the orchards adjacent to Phases 4 and 5. As a result, adverse impacts on adjacent and nearby agricultural crops and on orchards could potentially occur. This impact is considered potentially significant.

Impact
8-7

Localized Concentrations of Diesel Exhaust Particulate Matter in the Vicinity of the Processing Plant. *Predicted airborne concentrations of diesel exhaust particulate matter would result in an increased cancer risk to nearby sensitive receptors exceeding applicable standards. Implementation of the proposed project would extend the period of exposure by up to 30 years. Extended exposure to diesel exhaust can result in cancer, respiratory effects, and other health problems, and longer exposure periods can increase the risk of contracting diesel-related health problems. Therefore, this impact is considered **significant**.*

Air dispersion modeling is used to assess the risk of predicted concentrations of diesel exhaust in the vicinity of sensitive receptors. Risk-assessment practices rely on exposure estimates derived from a hypothetical maximally exposed individual. A maximally exposed individual is a hypothetical person who might spend a 70-year lifetime living at the point of greatest deposition from a plume of contaminant emissions from an industrial facility.

Multiple factors determine whether the exposure of a receptor to a toxic air contaminant (TACs) exceeds the PCAPCD's recommended action level for cancer (10 in a million for the maximally exposed individual) or chronic and acute hazard index risk levels (one or higher for the maximally exposed individual). The dose subjected to the maximally exposed individual is primarily a function of the concentration of a substance or substances in the environment and the extent of exposure that person has with the substance.[8] Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the maximally exposed individual. Thus, the risks estimated for a maximally exposed individual are higher if a fixed exposure occurs over a longer period of time.

Air dispersion modeling using the EPA-approved ISCST3 model was conducted for both existing conditions and proposed project conditions (for the previously proposed project) for the purpose of determining predicted concentrations of diesel exhaust particulate matter in the vicinity of the project site and nearby sensitive receptors.

Based on the modeling performed, a screening level health risk assessment was conducted for the

[8] The Presidential/Congressional Commission on Risk Assessment and Risk Management. *Framework for Environmental Health Risk Assessment, Final Report*. Washington, D.C. 1997. Available for download at www.riskworld.com/Nreports/1996/risk_rpt/.

purpose of determining carcinogenic and chronic health risks to nearby receptors associated with emissions of diesel exhaust particulate matter (Appendix D). The estimated risk values are based on ground level concentrations at the nearest maximum affected sensitive receptor, based on the maximum concentrations predicted to occur during mining of those phases that are located nearest the affected sensitive receptors (i.e., Phases 1, 2, 3, and 6), calculated over an estimated 70-year period of exposure. The methods used for calculating carcinogenic risk, hazard indices, and cancer burden are based on conservative emission factors and assumptions to ensure results that do not understate potential health risks. As a result, the following assessment should be considered a “screening level” assessment in that it predicts the upper boundary of risk and may overestimate future conditions. Therefore, actual human health risks would not be anticipated to exceed predicted levels and may, in actuality, be less. This health-conservative 70-year screening level approach to assessing risk is consistent with guidance provided by EPA, OEHHA, and CARB. In the event that the screening level assessment indicates a significant risk to public health, a more detailed health risk assessment would be advisable. The more detailed health risk assessments typically involve refinement of the emission factors and assumptions used in the analysis and, if necessary, a quantitative evaluation of mitigation measures necessary to reduce public health risk. The results of the modeling performed for each of the project impact areas (i.e., receptors located near the mine processing facility and along the existing haul truck route within the town of Sheridan) are discussed separately below.

As previously discussed, estimated risk values for this project analysis are calculated for a 70-year period of exposure in accordance with industry-accepted guidance documents from EPA, OEHHA, and CARB. These values are used in comparison to the threshold of 10 in 1 million (10×10^{-6}) for determining whether the proposed project would result in a significant health risk impact related to diesel exhaust. It is important to note, however, that the proposed project includes extension of the mine’s active life by up to 30 years, rather than 70 years. The potential health risk resulting from the project, therefore, is more realistically represented by using a 30-year period of exposure rather than the 70-year period (Salinas, pers. comm., 2004). For informational purposes, therefore, the 30-year risk value is shown in Table 8-13 in addition to the 70-year value. This EIR, however, uses the health-conservative industry standard of 70 years of exposure as the basis of its impact conclusions.

Based on the modeling conducted, the peak diesel exhaust particulate matter impacts from onsite sources and related on-highway travel near the facility were estimated to occur along the facility boundaries near the aggregate processing and active mining areas. This is the case because the emissions produced by mining and onsite transport equipment would be substantially greater than emissions estimated for the on-highway haul trucks operating on public roads accessing the facility. As the results suggest, the highest impacts occur at occupied residences that are nearest to the boundaries of active areas within the facility. The maximum modeled annual average concentrations for exposures at the maximally exposed residential receptors, the Unit Risk Value, and the corresponding cancer risk resulting from the modeled exposure levels are presented in Table 8-13. As shown, concentrations of diesel particulate matter near the facility would increase in comparison to baseline conditions, and would result in incremental cancer risk levels greater than 10 in 1 million. However, it is important to note that these results are conservatively high, as the screening risk assessment method used in this analysis does not account for future, lower emissions rates from mobile equipment resulting from technological advances anticipated to occur in future years. Because there are no offsite workplaces or sensitive receptors near the facility, only residential exposures were evaluated.

Table 8-13
Summary of Diesel Exhaust Particulate Matter Cancer Risks Near the Facility[1]

Operating Scenario	Maximum Modeled Average Annual Impact ($\mu g/m^3$)	Unit Risk Value $(\mu g/m^3)^{-1}$	Additional Cancer Risk (70 years)	Additional Cancer Risk[2] (30 Years)
Baseline	0.43	3.0×10^{-4}	129×10^{-6}	55×10^{-6}
Phase 1[3]	1.59	3.0×10^{-4}	477×10^{-6}	204×10^{-6}
Phase 2	0.173	3.0×10^{-4}	51.9×10^{-6}	22.2×10^{-6}
Phase 3	0.148	3.0×10^{-4}	44.4×10^{-6}	19.0×10^{-6}
Phase 6	1.17	3.0×10^{-4}	351×10^{-6}	150×10^{-6}

1 Based on dispersion modeling conducted in 2002; does not reflect subsequent changes in mine phasing, daily hours of operation, and emission rates.
2. 30-year risk value extrapolated from the 70-year value (Salinas, pers. comm., 2004).
3 Reclamation of the settling pond in the northwestern portion of Phase 1 is not currently permitted, but would occur during reclamation of Phase 1.
Source: Sierra Research 2002a

After preparation of the screening level analysis, a more detailed analysis of diesel exhaust PM cancer risks was conducted to evaluate the impacts associated with the near-term phases of the proposed project and to determine the contributions of various major project sources to overall cancer risks. The more detailed analysis of diesel exhaust particulate matter impacts focused on those phases of the project located within close proximity to nearby sensitive receptors for which more refined emission factors were available (i.e., Phases 2 and 3). The analysis excluded the remaining phases of the proposed project located in the vicinity of nearby sensitive receptors, including Phase 6, as these activities are scheduled to occur after 2020, which was the predictive limit of the emission factor models at the time the dispersion modeling was conducted. The maximum annual diesel exhaust particulate matter impacts associated with Phases 2 and 3 of the proposed project and source contributions are summarized in Table 8-14.

Based on the more detailed modeling conducted, the maximum annual diesel exhaust particulate matter impacts predicted to occur during mining of the Phase 2 and Phase 3 mining areas at an occupied residence were 0.219 and 0.148 $\mu g/m^3$, respectively. As indicated in Table 8-14, predicted concentrations are highest during mining of the proposed Phase 2 mining area, which includes reclamation activities proposed as part of this project. Based on these modeling results, the maximum impact from most of the contributing sources, and that of the combined sources operating simultaneously, generally occur in the vicinity of the Camp Far West Road/Porter Road intersection. The maximum resultant 70-year increased cancer risk, which would occur during mining of Phase 2, would be 6.6×10^{-5} (or 2.8×10^{-5} for a 30-year exposure period). By comparison, the cancer risk threshold is 1×10^{-5} annual average impact at a residence or workplace (Sierra Research 2002b).

Table 8-14
Maximum Annual Diesel Exhaust Particulate Matter Impacts, Phases 2 and 3[1]

Source	Phase 2	Phase 3

Table 8-14 Maximum Annual Diesel Exhaust Particulate Matter Impacts, Phases 2 and 3[1]		
Maximum Annual Impact (μg/m^3)		
Aggregate Processing Area	0.124	0.074
Mining Area	0.021	0.024
Pond Reclamation[2]	0.0002 [1]	N/A
Diesel Pump	0.022	0.022
Haul Trucks on Public Roads	0.063	0.053
All Sources Combined	0.219	0.148
Maximum Annual Impact at Combined Source Peak Impact Site (μg/m^3)		
Aggregate Processing Area	0.124	0.074
Mining Area	0.021	0.011
Pond Reclamation[2]	0.0001	N/A
Diesel Pump	0.011	0.011
Haul Trucks on Public Roads	0.063	0.053
All Sources Combined	0.219	0.148

1 Based on dispersion modeling conducted in 2002; does not reflect subsequent changes in mine phasing, daily hours of operation, and emission rates.

2 Reclamation of the settling pond in the northwestern portion of Phase 1 is not currently permitted, but would occur during reclamation of Phase 1. Source concentrations are not additive when determining total concentrations.

Source: Sierra Research 2002b

Most facility and on-highway hauling operations were assumed, for modeling purposes, to occur during existing operating hours between 6 a.m. and 5 p.m. Operating hours for the diesel-powered water pump were assumed to extend between 5 a.m. and 5 p.m. daily. The proposed asphalt batch plant was assumed to operate 24 hours per day.

Since completion of the dispersion modeling, the proposed daily hours of operation have changed. As currently proposed, most processing and mining activities, including the proposed asphalt batch plant, would occur between 5 a.m. and midnight, with the exception of the crushing plant. The crushing plant would be limited to 7 a.m.–10 p.m. Material hauling would occur between 6 a.m. and 5 p.m., Monday through Friday, and 6 a.m.–noon on Saturdays. However, no change has occurred in the annual processing rate of number of haul truck trips, in comparison to those used for dispersion modeling and health risk assessments.

The subsequent increase in the hours of mining and plant operations, in comparison to those assumed for dispersion modeling, may result in increased hourly or daily concentrations of diesel exhaust particulate matter. However, predicted concentrations of diesel exhaust particulate matter and corresponding health risks are currently based on annual average concentrations calculated at the nearest receptor. No inhalation Reference Exposure Level (REL) for acute (i.e., short-term) effects has been determined by OEHHA. (The REL is the concentration at or below which no adverse health effects are anticipated.) Given that the annual processing rates and number of haul truck trips assumed for the proposed project has not changed, the predicted annual concentrations and corresponding health risks, as depicted in Tables 8-13 and 8-14, would still be considered generally representative of the proposed project. Predicted airborne concentrations of diesel exhaust particulate matter, in comparison to baseline conditions, would result in an increased cancer risk to nearby sensitive receptors that would exceed applicable standards. Because the proposed project would result in increased cancer risk to nearby sensitive receptors associated with emissions of diesel PM and because the proposed project would extend the period of exposure by 20 to 30 years, this impact is considered significant. Consequently, this impact is considered significant.

Impact
8-8

Localized Concentrations of Diesel Exhaust Particulate Matter within Sheridan. *Implementation of the proposed project would result in reduced haul truck traffic along the existing haul route and corresponding reductions in mobile source diesel exhaust particulate matter. The proposed project, however, would extend the period of exposure by up to 30 years; therefore, this impact is considered* ***significant****.*

The proposed project would contribute to offsite emissions of diesel exhaust particulate matter concentrations at receptors located along the existing haul route. Within the town of Sheridan, peak diesel exhaust particulate matter impacts were estimated by the ISCST3 model to occur near the public roads used by product haul trucks. Annual average concentrations and corresponding cancer risks were modeled for exposures at the maximally exposed residential, workplace, and sensitive receptors. The time adjustment factor for residential exposures assumes that residents are exposed continuously for 8,760 hours per year for 70 years. The time adjustment factor for workplace exposures assumes that offsite workers are exposed to concentrations for every hour that the facility operates and for 46 years during their employment career. The factor for sensitive receptor exposures assumes that sensitive individuals are located at the maximally exposed residence for a 70-year lifetime. Although the time adjustment factors assume very high exposure periods, they reflect the typical health-conservative analysis methods. Sensitive receptors include facilities that house or attract children, the elderly, or people with illnesses or others who are especially sensitive to the effect of air pollutants. Modeled concentrations and estimated carcinogenic risks are summarized in Table 8-15.

As previously discussed, estimated risk values for this project analysis are calculated for a 70-year period of exposure in accordance with industry-accepted guidance documents from EPA, OEHHA and CARB. These values are used in comparison to the threshold of 10 in 1 million (10×10^{-6}) for determining whether the proposed project would result in a significant health risk impact related to diesel exhaust. It is important to note, however, that the proposed project includes extension of the mine's active life by up to 30 years, rather than 70 years. The potential health risk resulting from the project, therefore, is more realistically represented by using a 30-year period of exposure rather than the 70-year period (Salinas, pers. comm., 2004). For informational purposes, therefore, the 30-year risk value is shown in Table 8-15 in addition to the 70-year value. This EIR, however, uses the health-conservative industry standard of 70 years of exposure as the basis of its impact conclusions.

Table 8-15 Summary of Diesel Exhaust Particulate Matter Cancer Risks Within Sheridan,[1] Existing Haul Route (Riosa Road)					
Receptor Type	Maximum Modeled Annual Average Impact µg/m^3	Unit Risk Value (µg/m^3)$^{-1}$	Time Adjustment Factor	Additional Cancer Risk (70 years)	Additional Cancer Risk[2] (30 years)
Residential	0.0466	3.0 x 10^{-4}	1.0	14 x 10^{-6}	6.0 x 10^{-6}
Workplace	0.0087	3.0 x 10^{-4}	0.66	1.7 x 10^{-6}	0.7 x 10^{-6}
Sensitive	0.0466	3.0 x 10^{-4}	1.0	14 x 10^{-6}	6.0 x 10^{-6}

1 Based on dispersion modeling conducted in 2002; does not reflect subsequent changes in emission rates.
2. 30-year risk value extrapolated from the 70-year value (Salinas, pers. comm., 2004).
Source: Sierra Research 2002b

As shown in Table 8-15, the estimated cancer risks are highest at residential receptors and other potentially sensitive receptor sites. Although the number of haul truck trips attributable to the proposed project would decrease in comparison to baseline conditions, associated cancer risks would continue to exceed the applicable threshold of 10 in 1 million.

OEHHA has recommended an ambient concentration of 5 µg/m^3 as the chronic inhalation REL for diesel exhaust. (The REL is the concentration at or below which no adverse health effects are anticipated.) No inhalation REL for acute (i.e., short-term) effects has been determined by OEHHA. Table 8-16 shows the maximum modeled annual average concentrations for exposures at the maximally exposed residential, workplace, and sensitive receptors, the REL for chronic noncancer impacts, and the corresponding hazard index resulting from the modeled exposure levels at these locations. As shown in Table 8-16, the estimated chronic hazard indices at the maximally exposed receptors within Sheridan are less than the chronic inhalation REL for diesel exhaust particulate matter under the proposed project. The proposed project, however, would extend the period of exposure by 20 to 30 years; therefore, this impact is considered significant.

Table 8-16 Summary of Modeled Chronic Hazard Indices Within Sheridan[1]			
Receptor Type	Maximum Modeled Annual Impact µg/m^3	Chronic Reference Exposure Level µg/m^3	Chronic Hazard Index
Riosa Road (Baseline)			
Residential	0.0466	5	0.0093
Workplace	0.0084	5	0.0017
Sensitive	0.0466	5	0.0093

1 Based on dispersion modeling conducted in 2002; does not reflect subsequent changes in emission rates.
Source: Sierra Research 2002b

Impact
8-9

<u>Airborne Concentrations of Asbestos Fibers.</u> *The project site is not located within an area mapped by the State as likely having an occurrence of asbestos-containing mineral deposits. In addition, onsite geologic reconnaissance of the proposed expansion areas has not identified any onsite deposits of aggregate that contain asbestos. This impact is considered* ***less than significant.***

The proposed project is not located within an area mapped by the State of California as likely having an occurrence of asbestos-containing mineral deposits. In addition, onsite geologic reconnaissance of the proposed expansion areas has not identified any onsite deposits of aggregate that contain asbestos. Although the likelihood of asbestos-containing aggregate to be present on the site is considered minimal, future mining within these areas may uncover previously unidentified deposits of such aggregate. In these cases, all future mining activities would be required to comply with applicable PCAPCD rules and regulations pertaining to asbestos. Compliance with these rules and regulations (e.g. PCAPCD Rules 244 and 905) would prevent nearby sensitive receptors from being exposed to increased concentrations of asbestos in comparison to baseline conditions. Due to the minimal likelihood that asbestos-containing aggregate is present in the mine expansion areas, and because current applicable PCAPCD rules and regulations would protect public health in the unlikely event asbestos is uncovered, this impact is considered less than significant.

Impact
8-10

<u>Increases in Detectable Odors at Nearby Receptors</u>*. Implementation of the proposed project may result in increased odors at nearby sensitive receptors, primarily associated with the proposed operation of the asphalt batch plant. Additional sources of odorous emissions include the operation of diesel-powered equipment and haul trucks in mining Phase 6, which lies closer to nearby residences than existing mining and processing areas. As a result, this impact is considered* ***potentially significant****.*

Implementation of the proposed project may result in increased odors at nearby sensitive receptors, primarily associated with the proposed operation of the asphalt batch plant. Additional sources of odorous emissions include the operation of diesel-powered equipment and haul trucks. Potentially odorous emissions associated with the proposed asphalt batch plant would be associated primarily with the operation of the dryer and the mixing tower, which may include emissions of particulate matter, SO_X, and volatile organic compounds. Because of the relatively low release height of emissions associated with the asphalt batch plant and onsite diesel-powered equipment and the proximity of proposed expansion phases (i.e., Phase 6) to nearby sensitive receptors, there could be an increase in odor concentrations at nearby sensitive receptors. As a result, this impact is considered potentially significant.

Impact
8-11

<u>Airborne Concentrations of Crystalline Silica.</u> *Future mining activities within the expansion areas may result in emissions of crystalline silica. As a result, this impact is considered* ***potentially significant****.*

Because of its abundance in the earth, silica, in both its crystalline and noncrystalline states, is present in nearly all mining operations. It is in the host rock, in the ore being mined, as well as in what geologists call the overburden, the soil and surface material above the bedrock. Most ores are mined from deposits containing crystalline silica. The most common form of crystalline silica is quartz. The mineralogy of the deposit and, to some extent, the processing of the ore determine the quartz content of the final product. Sand and gravel consist mostly of quartz, whereas the quartz content of crushed stone will vary from region to region.

Prolonged and excessive exposure to crystalline silica dust in mining environments can cause silicosis, a noncancerous lung disease. During the 1980s, studies were conducted that suggested that crystalline silica also was a carcinogen. As a result of these findings, crystalline silica has been regulated under the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (HCS). Under the HCS, OSHA-regulated businesses that use materials containing 0.1 percent or more crystalline silica must follow federal guidelines concerning hazard communication and worker training. Although the HCS does not require that samples be analyzed for crystalline silica, mineral suppliers or OSHA-regulated businesses may choose to do so if they wish to show that they are exempt from the requirements of the HCS.

The Mine Safety and Health Administration (MSHA) has proposed an HCS similar to the OSHA standard. The proposal is still under review following a public comment period. California passed the Safe Drinking Water and Toxic Enforcement Act of 1986, which includes crystalline silica of respirable size on its list of carcinogens. California's Air Toxic Hot Spots Act and Air Quality Act have the potential to restrict the emissions of crystalline silica. The State of California has not yet identified a unit risk value for the evaluation of health risks associated with crystalline silica, although one is currently being considered for adoption.

Future mining activities within the expansion areas may result in emissions of crystalline silica. Because mining of the proposed expansion areas would occur in closer proximity to nearby residences than mining under baseline conditions, increased concentrations of crystalline silica at these residences could occur. As a result, this impact is considered potentially significant.

8.4 MITIGATION MEASURES

No mitigation measures are required for the following less-than-significant impacts.

- 8-3: Localized Concentrations of Carbon Monoxide Emissions
- 8-9: Airborne Concentration of Asbestos Fibers

Mitigation measures are provided below for *significant* or *potentially significant* impacts of the proposed project.

Mitigation Measure R8-1(a): Prepare and Implement a Construction Dust Mitigation Plan. The applicant shall submit a construction dust mitigation plan to the PCAPCD for review and approval. The plan shall be deemed adequate and approved by the PCAPCD for mitigating onsite demolition and construction-generated emissions before any onsite demolition or construction activities begin. This plan shall specify the methods used to control dust and particulate matter, demonstrate the availability of needed equipment and personnel, and identify a responsible individual who can authorize the implementation of additional measures, if needed. Mitigation measures shall include the following or other equally effective measures, at a minimum:

- All disturbed areas, including storage piles, that are not being actively used for construction purposes shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, or vegetative ground cover.
- All onsite unpaved roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.
- All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall be effectively controlled of fugitive dust emissions using application of water or by presoaking.
- When materials are transported offsite, all material shall be covered and effectively wetted to limit visible dust emissions, or at least 6 inches of freeboard space from the top of the container shall be maintained.
- All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at least once every 24 hours when operations are occurring.
- Following the addition of materials to, or the removal of materials from, the surfaces of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions using sufficient water or chemical stabilizer/suppressant.
- Onsite vehicle speeds on unpaved surfaces shall be limited to 15 mph.
- Wheel washers shall be installed for all trucks and equipment exiting from unpaved areas, or wheels shall be washed to remove accumulated dirt before such vehicles leave the site.
- All excavation and grading operations shall be suspended when fugitive dust exceeds PCAPCD Rule 228 fugitive dust limitations.
- All trucks and equipment leaving the site shall be washed.
- Areas subject to excavation and grading at any one time shall be limited to the fullest extent possible.
- Water, or other dust suppressant approved for use by the PCAPCD, shall be applied to structures proposed for demolition at a rate that effectively limits the generation of fugitive dust.
- Open burning of removed vegetation shall be prohibited during infrastructure improvements. Vegetative material shall be chipped or delivered to waste-to-energy facilities.
- Idling time for all diesel-powered equipment shall be limited to 5 minutes.
- An operational water truck shall be onsite at all times. Water shall be applied to control dust as needed to prevent dust impacts onsite.
- Low sulfur fuel shall be used for stationary construction equipment.
- Low emission onsite stationary equipment shall be used.
- Existing power sources (e.g., power poles) or clean fuel generators shall be used rather

than temporary diesel power generators.

Mitigation Measure R8-1(b): Properly Maintain and Use Off-Road Diesel Equipment. To reduce short-term emissions from onsite mobile source construction equipment, (e.g., NO_X and PM_{10}), the applicant shall implement the following mitigation measures:

- CARB-certified diesel-water emulsion fuel (e.g., $PuriNo_X$), or fuels/technological improvements (e.g., diesel exhaust particulate traps) approved for use by the PCAPCD that achieve equivalent reductions, shall be used in all off-road construction equipment. The applicant may choose to perform more refined modeling of the onsite mobile source equipment. If the results of the modeling demonstrate to the satisfaction of PCAPCD that this measure is no longer needed to meet the PCAPCD's recommended thresholds for cancer and non-cancer risk, this measure will not be required.
- Onsite truck and equipment engines shall be maintained in good running condition, in accordance with manufacturers' specifications. Maintenance records demonstrating compliance shall be kept onsite by the applicant and shall be made available to Placer County upon request.

Mitigation Measure R8-1(c): Control Visible Emissions from Off-Road Diesel-Powered Equipment. To control visible emissions from off-road diesel-powered equipment, the applicant shall ensure that emissions from all off-road diesel-powered equipment used on the project site do not exceed 40 percent opacity for more than 3 minutes in any one hour. Any equipment found to exceed 40 percent opacity shall be repaired immediately, and the PCAPCD shall be notified of the noncompliant equipment within 48 hours. A visual survey of all in-operation equipment shall be made at least weekly, and a monthly summary of the visual survey results shall be submitted to the PCAPCD throughout the duration of the project, except that the monthly summary shall not be required for any 30-day period in which no construction activity occurs. The individual conducting the survey shall be certified by CARB in evaluation of visible emissions. The monthly summary shall include the quantity and type of vehicles surveyed, as well as the dates of each survey. Survey reports demonstrating compliance shall be kept onsite by the applicant and shall be made available to Placer County upon request. The PCAPCD and/or other officials may conduct periodic site inspections to determine compliance. Nothing in this measure shall supersede other PCAPCD or state rules and regulations.

Mitigation Measure R8-1(d): Control Fugitive Dust Emissions from Haul Trucks on Public Roads. The applicant shall pave the access road leading from Camp Far West Road to the processing plant. The applicant shall limit or expeditiously remove the accumulation of mud or dirt from the access road at least once every 24 hours when operations are occurring.

Mitigation Measure R8-1(e): Control Fugitive Dust Emissions from Storage Piles During Mining of Phase 6. The storage of overburden material within the area designated in this report as proposed Phase 6 shall be prohibited during periods when active mining or reclamation of this area is not occurring. Stockpiled materials shall be located at the greatest distance feasible from nearby residences and maintained in accordance with Mitigation Measure R8-1(a). An operational water truck shall be onsite at all times. Water shall be applied to control dust as needed to prevent dust impacts offsite.

Mitigation Measure R8-2(a): Develop and Implement an Operational Fugitive Dust Control Plan. The applicant shall develop and implement a fugitive dust control plan for purpose of reducing project-related fugitive dust emissions associated with the long-term operation of the proposed project. The proposed plan shall include those measures identified in Mitigation Measure R8-1(a), at a minimum, and shall be submitted to and approved by the PCAPCD before implementation of the proposed project. This plan shall also specify that transport and placement of overburden to the settling pond located along the northern boundary of the Phase 1 mining area shall occur evenly over a 28-day period rather than a 14-day period.

Mitigation Measure R8-2(b): Implement Measures to Reduce Onsite Mobile-Source and Stationary-Source Emissions. The applicant shall implement the following measures:

- The applicant shall comply with PCAPCD Rule 502, New Source Review, requiring, in part, that the applicant provide offsets for any increase in cumulative emissions of ROG, NO_X, SO_X, CO, and PM_{10} associated with the operation of any new or modified emission sources, such as the proposed asphalt batch plant.
- The applicant shall install Best Available Control Technology to minimize emissions associated with the operation of the proposed asphalt batch plant, such as use of a fabric filter (baghouse) for control of particulate emissions. Fabric filters can reduce particulate emissions by 90–99 percent. In addition, both dry limestone injection into the asphalt dryer drum and the use of low-sulfur fuel have been found to be effective at reducing SO_2 emissions by an average of 90 percent and CO emissions can be reduced by an average of 50–90 percent with proper maintenance and adjustment of the burner in the dryer drum (AWMA 2000).
- The applicant shall implement Mitigation Measures R8-1(b) and R8-1(c) described above.
- The off-road diesel powered equipment used at this facility shall meet the emission standards for 2003 off-road equipment by December 31, 2005. Any off-road diesel powered equipment that does not meet 2003 emission standards by December 31, 2005, shall be phased out by December 31, 2007. After 2005, at this facility the

applicant shall purchase and use only equipment that meets the most recent emission standards for off-road diesel powered equipment available at the time of purchase.

- The applicant shall offset any increase in project emissions associated with the proposed project through onsite control measures or participation in the PCAPCD's Offsite Mitigation Program. The applicant could pay an in-lieu fee to the PCAPCD on an annual basis to meet the emission-offset requirements.

Mitigation Measure R8-2(c): Install and Use a Conveyor Belt to Reduce Particulate Emissions. Before implementation of the proposed project, the applicant shall install an electricity-powered conveyor belt system for use during the proposed mining phases for the transport of run-of-pit material to the aggregate processing area. The conveyor belt system shall be equipped with belt scrapers and/or a belt wetting system for the control of dust generated by conveyor belt carryback. This conveyor belt system shall be powered by electricity supplied from the local power supplier and not from diesel generators. A backup electrical system (powered by diesel or natural gas) may be used temporarily when there is a disruption to electrical line service at this facility or a mechanical breakdown of equipment. The applicant may use diesel powered off-road equipment to transport run-of-pit material to the aggregate processing area during a disruption of electrical service or mechanical breakdown as long as the applicant follows standard PCAPCD "upset breakdown" procedures. PCAPCD shall have the discretion to determine the length of time the applicant can operate under these conditions.

Mitigation Measure R8-4: Implement Measures to Reduce Mobile-Source and Stationary-Source NO_2 Concentrations. Before implementation of the proposed project, the applicant shall implement the following measures:

- The existing diesel-powered water pump shall be converted to an electric-powered pump.
- The applicant shall implement Mitigation Measures R8-1(b), R8-2(b), and R8-2(c) described above.

Mitigation Measure R8-5: Implement Measures to Reduce and Monitor PM_{10} Concentrations. The applicant shall implement the following measures:

- The applicant shall prepare and submit an air monitoring plan to the PCAPCD 90 days before implementation of the proposed project, with monitoring to begin within 30 days of approval of the plan. The air monitoring plan shall include provisions to perform ambient air monitoring for PM_{10} for a reasonable period of time to be determined by the PCAPCD.
- The applicant shall implement Mitigation Measures R8-1(a), R8-1(c), R8-1(d), and R8-1(e) described above.

Mitigation Measure R8-6(a): Implement Measures to Reduce Particulate Deposition on Nearby Agricultural Crops and Orchards. The applicant shall implement Mitigation Measures R8-1(a), R8-1(c), R8-1(d), R8-1(e), and R8-2(c) described above.

Mitigation Measure R8-6(b): Implement Measures to Control Particulate Emissions From Off-Road Diesel Equipment. The applicant shall implement Mitigation Measures R8-1(c), R8-1(d), R8-2(b), R8-2(c), and R8-4 described above.

Mitigation Measure R8-7: Implement Measures to Reduce Concentrations of Diesel Exhaust Particulate Emissions. The applicant shall implement Mitigation Measures R8-2(c) and R8-4 described above.

Mitigation Measure R8-10: Implement Measures to Decrease Detectable Odors at Nearby Receptors. The applicant shall implement Mitigation Measures R8-2(b) and R8-2(c).

Mitigation Measure R8-11: Implement Measures to Decrease Airborne Concentrations of Crystalline Silica. The applicant shall implement the following measures:

- If a crystalline silica unit risk value is adopted by CARB during the life of the project, the applicant shall comply with the AB 2588 facility prioritization and health risk assessment requirements.
- The applicant shall prepare and submit an air monitoring and operational response plan to the PCAPCD 90 days before implementation of the proposed project, with monitoring to begin within 30 days of approval of the plan. The air monitoring plan shall include provisions to perform ambient air monitoring for crystalline silica in accordance with approved methods and for a period of time to be determined by the PCAPCD. If an approved method for monitoring crystalline silica is not available, then the plan shall state that sampling will commence as soon as an approved method is identified. If, during monitoring, airborne crystalline silica is identified, the applicant shall consult with the PCAPCD to determine feasible mitigation measures to be implemented as operational responses to ensure that health risks to sensitive receptors remain within established acceptable levels of risk.

8.5 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Impact 8-1: Short-Term Increases in Regional Criteria Pollutants and Precursors. The proposed construction activities on the Patterson mine site would result in PM_{10} emissions in excess of the significance thresholds for the duration of the proposed construction activities (Impact 8-1). Implementation of Mitigation Measures R8-1(a) through R8-1(e) would reduce fugitive dust impacts, but not to a less-than-significant level. As a result, this impact is considered *significant and unavoidable* for the expansion project as proposed.

Impact 8-2: Long-term Increases in Regional Criteria Pollutants and Precursors. Mining and reclamation activities would generate regional emissions of pollutants that would exceed the significance thresholds for ROG, NO_X, and PM_{10} (Impact 8-2). Implementation of proposed and recommended mitigation measures would reduce emissions of regional criteria pollutants and precursors. Additional reductions would also occur with implementation of Mitigation Measure R8-7. However, net increases in regional criteria pollutants would not be reduced to a less-than-significant levels. As a result, this impact is considered *significant and unavoidable* for the expansion project as proposed.

Impact 8-4. Localized Concentrations of Nitrogen Dioxide in the Vicinity of the Processing Plant. Implementation of the proposed and recommended mitigation measures would reduce NO_X concentrations at nearby receptors. However, based on the data available, it is unclear whether these mitigated reductions would result in reduced concentrations (in comparison to baseline) or whether predicted mitigated NO_X concentrations would be reduced to below applicable ambient air quality standards. For these reasons, this impact is considered *significant and unavoidable* for the expansion project as proposed.

Impact 8-5. Localized Concentrations of PM_{10} in the Vicinity of the Processing Plant. Implementation of proposed and recommended mitigation measures would reduce emissions of PM_{10}, but not to a less-than-significant level. As a result, this impact is considered *significant and unavoidable* for the expansion project as proposed.

Impact 8-6. Particulate Deposition on Nearby Agricultural Crops. Implementation of proposed and recommended mitigation measures would reduce emissions of PM_{10}, but not to a less-than-significant level. As a result, this impact is considered *significant and unavoidable* for the expansion project as proposed.

Impact 8-7. Localized Concentrations of Diesel Exhaust Particulate Matter in the Vicinity of the Processing Plant. Additional dispersion model runs were conducted to determine the effectiveness of various mitigation options available to reduce diesel exhaust particulate matter impacts. Based on the modeling conducted for Phases 2 and 3, the mine haul trucks contributed 57.3 percent of the diesel exhaust particulate matter emissions in the Phase 2 mining area, and 52.0 percent of the emissions in the aggregate processing area. Substitution of a conveyor belt for the use of these vehicles in transporting run-of-pit material to the aggregate processing area, and substitution of an electric motor for the diesel-powered water pump, are estimated to reduce cancer risks associated with diesel exhaust particulate matter by approximately 42 percent (Sierra Research 2002b). Use of CARB-certified diesel-water emulsion fuel (e.g., PuriNOx) would reduce equipment emissions by 63 percent and overall cancer risks associated with diesel exhaust particulate matter cancer by an additional 18 percent (Sierra Research 2002b). Reductions in cancer risk with implementation of available mitigation measures are summarized in Table 8-17.

Table 8-17 Reductions in Cancer Risk with Implementation of Available Mitigation Measures				
Source	Initial Cancer Risk ($\mu g/m^3$)	Conveyor & Conversion Reductions (Percent) [1]	Emulsified Diesel Fuel Reductions (Percent) [2]	Mitigated Cancer Risk ($\mu g/m^3$)
Aggregate Processing Area	3.73×10^{-5}	52	63	0.664×10^{-5}
Phase 2 Mining Area	0.629×10^{-5}	57	63	0.100×10^{-5}
Pond Reclamation	0.004×10^{-5}	0	63	0.001×10^{-5}
Diesel Pump	0.322×10^{-5}	100	0	0
Haul Trucks on Public Roads	1.89×10^{-5}	0	0	1.89×10^{-5}
All Sources Combined	6.58×10^{-5}			2.66×10^{-5}
Cancer Risk Threshold	1.0×10^{-5}			

[1] Substitution of a conveyor belt for the use of these vehicles in transporting run-of-pit material to the aggregate processing, and substitution of an electric motor for the diesel-powered water pump.

[2] Use of CARB-certified diesel-water emulsion fuel (e.g., PuriNO$_X$)

Source: Sierra Research 2002b

As indicated in Table 8-17, implementation of a conveyor system, conversion of the onsite diesel-powered water pump, and use of a diesel-water emulsion fuel would reduce the cancer risk attributable to onsite sources to a maximum of 0.765×10^{-5}, which is below the threshold recommended by the PCAPCD. However, the overall combined cancer risk at nearby receptors, when including impacts from haul trucks on public roads near the mine, would continue to exceed the threshold level, resulting in a combined cancer risk of 2.66×10^{-5}.

As previously discussed, CARB has identified particulate emissions from diesel-fueled engines (diesel particulate matter) as a TAC. Following this identification process, CARB was required by law to determine whether there is a need for further control, which necessitated the initiation of the risk management phase of the diesel particulate matter program. For the risk management phase, CARB created the Diesel Advisory Committee, which consists of staff from CARB, EPA, state and local agencies, industry representatives, environmental groups, and concerned members of the public. With the assistance of the Diesel Advisory Committee and its subcommittees, CARB developed the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* (2000a) and the *Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines* (2000b). CARB approved these plans on September 28, 2000 (CARB 2002).

CARB is currently in the process of implementing the control measures identified in the diesel particulate matter program. During this control measure phase, specific statewide regulations designed to further reduce emissions of diesel particulate matter from diesel-fueled engines and vehicles will be evaluated and developed. The goal of each regulation is to make diesel engines as clean as possible by establishing state-of-the-art technology requirements or emission standards to reduce emissions of diesel particulate matter. Although the diesel particulate matter program is ongoing, there are already existing regulations that mandate lower emissions of particulate matter from new on-road diesel-fueled vehicles. These regulations will require substantial reductions in particulate matter and other emissions from on-road heavy duty diesel-fueled engines beginning with the 2004 model year. Additionally, more stringent standards will apply to engines starting in the 2007 model year because of the adoption of federal standards at the state level, resulting in particulate matter emissions of less than 0.01 gram per brake horsepower hour (gm/bhp-hr) for these types of engines. Off-road vehicles will come under more stringent regulations beginning with the 2005 model year. CARB is currently working on proposed regulations to include a particulate matter reduction requirement, which would require particulate matter emissions to be less than 0.02 gm/bhp-hr for these types of engines. Currently, according to CARB, particulate matter emissions from heavy-duty diesel engines are on the average of approximately 0.1 gm/bhp-hr without controls. In comparison to the reductions achieved with implementation of the upcoming 2004 standards, implementation of the 2007 standards will result in up to an 85 percent reduction in PM emissions from large diesel-powered engines, with overall reductions in diesel PM-related health risks of approximately 70 percent by 2010 (CARB 2002, PCAPCD 2004).

Because health risk is determined based on an extended period of exposure, typically 70 years for the estimation of cancer risk, the predicted health risk impacts attributable to emissions of diesel particulate matter, as presented in this report, could be further offset by reductions in particulate matter emissions resulting from implementation of future regulations on diesel engines. As a result, this impact is considered *significant and unavoidable* for the foreseeable future, although this conclusion could change, if effective, statewide regulatory controls were implemented.

Impact 8-8. Localized Concentrations of Diesel Exhaust Particulate Matter within Sheridan. Health risk for this impact is determined based on an extended period of exposure, typically 70 years for the estimation of cancer risk. Similar to Impact 8-7 (Localized Concentrations of Diesel Exhaust Particulate Matter in the Vicinity of the Processing Plant), the predicted health risk impacts attributable to emissions of diesel particulate matter, as presented in this report, could be further offset by reductions in particulate matter emissions resulting from implementation of future regulations on diesel engines (see preceding discussion for Impact 8-7). As a result, this impact is also considered *significant and unavoidable* for the foreseeable future, although this conclusion could change, if effective, statewide regulatory controls were implemented.

Impact 8-10. Increases in Detectable Odors at Nearby Receptors. Implementation of the above recommended mitigation measures would reduce emissions of odorous compounds associated with the proposed long-term operation of the facility. However, given the close proximity of expansion Phase 6 and the existing haul route to nearby sensitive receptors, detectable emissions of diesel exhaust would still be anticipated to occur. As a result, this impact is considered *significant and unavoidable* for the expansion project as proposed.

Impact 8-11: Airborne Concentrations of Crystalline Silica. Implementation of the above recommended mitigation measures would ensure that associated health effects on nearby sensitive receptors remain at or below established standards for acceptable risk. Implementation of these measures would be sufficient to reduce this impact to a *less-than-significant* level.

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